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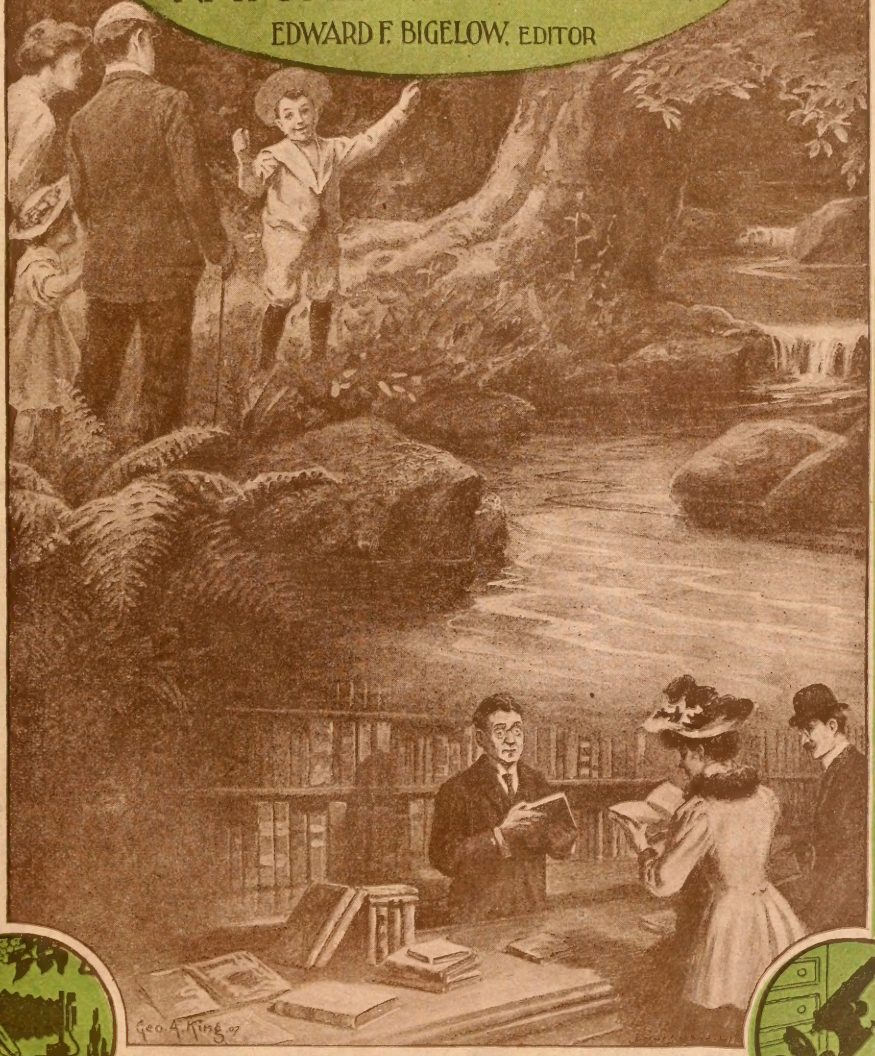


Vol. I APRIL, 1908 No. 1

THE GUIDE TO NATURE

AND TO NATURE LITERATURE

EDWARD F. BIGELOW, EDITOR







SUBSCRIPTION, - $1.50 PER YEAR. PUBLISHED AT STAMFORD, CONNECTICUT

Application has been made for entry at the Post Office at Stamford, as second class matter.

The naturalist's year begins in the spring; so does "The Guide to Nature."

ANNOUNCEMENT.

The time has come for the publication of a popular and accurate magazine of nature, natural science and outdoor interests. The workers have become so numerous, the fields so diversified, the advancements so important and the publications so profuse, that there is positive need of a magazine to unify and coordinate all. The general reader and the casual student and the lover of nature desire a survey of the whole field. The specialist reads the periodicals of his own special department and desires to know in general way what other workers are doing and observing, yet cannot spare money to subscribe to so many magazines nor time to read them. "The Guide to Nature" will supply the need of the general reader, the dilettante naturalist and the technical investigator.

The Agassiz Association proposes to publish this magazine as its Official Journal. This is in the eternal fitness of things for the AA is the oldest, most extensive and most efficient organization in the promotion of the love and knowledge of nature.

A Manual explaining the work of the AA will be mailed upon receipt of ten cents. Address The Agassiz Association. Executive Office: Stamford, Connecticut.

Nature is always new in the spring, and lucky are we if it finds us new also.—*John Burroughs.*

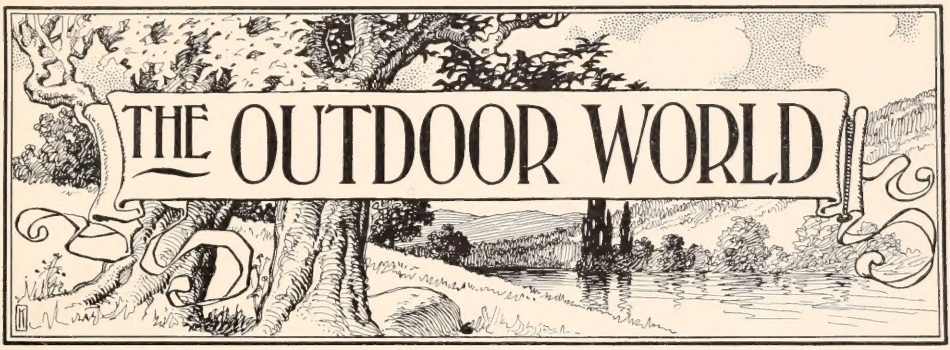
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"We love things not because they are beautiful, but they are beautiful because we love them."

The Guide to Nature

EDUCATION AND RECREATION

Vol. I APRIL, 1908 No. 1



A Hunt for Extinct Animals

By Prof. Earl Douglass

Carnegie Museum, Pittsburgh, Pa.

AFTER a voyage of two thousand miles over the prairie-ocean, I found myself on the rougher sea, in the troughs of the great solid, broken waves of the Rocky Mountains. I landed in Helena, had all the summer before me and all western Montana for my hunting-ground. I was after rare game which no one else had hunted in this region, so I had the field to myself. I was not going to slay living animals, but was gathering the precious remains of those that had died long ages ago, when there were no friends to shed a tear or carve an inscription on the rocks telling how and when they lived, or expressing the hope that their bones should rise again. But there are records more true than written ones, though he who runs cannot read them; he must go slow, stop, dig, and ponder long, for he is reading, not from books which men have made but from complex, mysterious, fascinating nature.

Dr. Henry Van Dyke has said that the charm of fishing is in its uncertainty. That which is sure to come to pass has little about it that is exciting or fascinating. Searching for the burial places of those strange animals that roamed over the green pastures and drank from the refreshing pools and streams, hundreds of millenniums before we came into possession of them, certainly has all the charm and fascination of uncertainty. When one starts out he does not know

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what he will find or whether he will find anything of importance. When he does find something it will probably not be the thing he is looking for. Many times as I have threaded the labyrinths of hot ravines I have beguiled the way and kept up my hope by seeing, in my mind, a huge reptile, from head to tail, stretched like a picture along some cliff; or, as I have trodden the arid hills I have seen, on a slab of sandstone, a whole skeleton of one of those little Cretaceous mammals which we know only by a jaw bone with a few teeth. What wouldn't we give to know the skeleton of one Cretaceous or Jurassic Mammal? I never have found these things of which I have dreamed, yet I have found the remains of scores of animals which I never expected to find, and with what delight I have picked up every fragment of the teeth and bones of some animal that no man had ever seen before.

My previous experiences in Montana had taught me that the places where the bones of extinct animals could be found were few and were usually separated by long distances, so I concluded that I would first go over the ground on horseback, and then, if I found any good localities, go with men, team, wagon, and camp outfit, and dig out, box and ship the fossils.

I tried to buy a saddle horse in Helena; but, in the midst of the land of cayuses, I found only one or two for sale; but the prices did not suit me, and they were too old to be valuable property, yet too recent to pass as relics of a former age. I decided to try to "pick up" a horse at one of the ranches, so I started for the place where I wished to begin my search. With trunk, grip and camera, I boarded a train and went back to

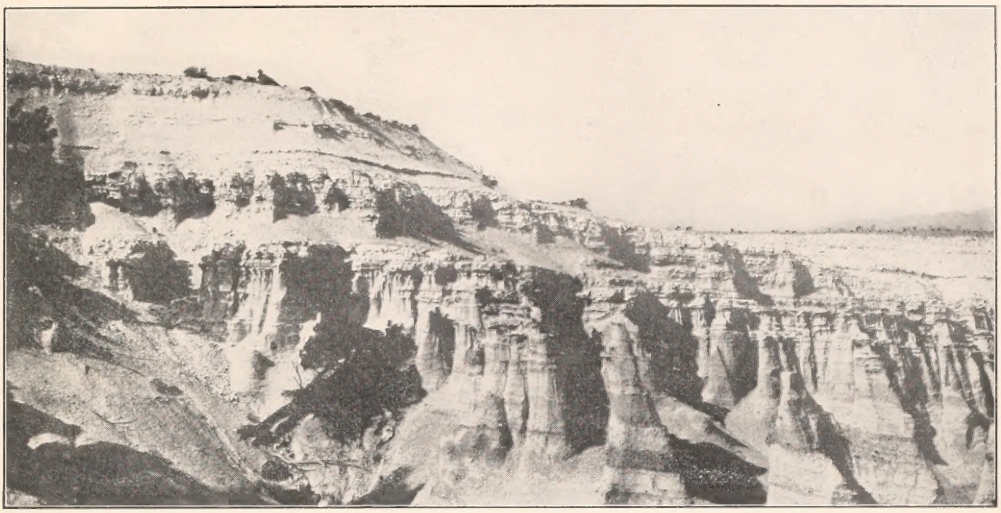


LOOKING ACROSS THE MISSOURI VALLEY FROM THE BAD LANDS.
BELT MOUNTAINS IN THE DISTANCE.
"The 'breaks' along the Misssouri Valley."

Winston, a little railroad station on a great rocky flat, to examine some bad-lands east of there along the Missouri River. I had, two or three times before, while passing in a wagon or train, caught glimpses of these chalky-looking deposits, but had never had the opportunity of examining them.

Leaving my baggage at the hotel in Winston, I started out on foot with sack and prospector's pick. After a walk of two or three miles I came to the "breaks" along the Missouri Valley, where, in places, the running waters have carved the soft rocks into fantastic forms.

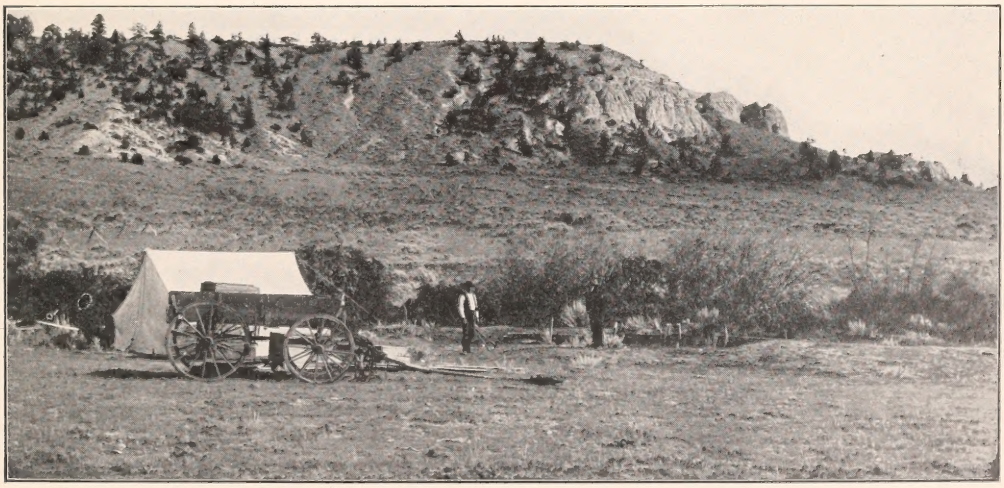
Here, where erosion had so thoroughly dissected the old deposits, I thought I would surely find some bones of an-



BAD LANDS NORTH OF BEAVER CREEK AND NORTHEAST OF WINSTON.
"Where the running waters have carved the soft rocks into familiar forms."

cient animals exposed, and I felt like one who has discovered a sportsman's paradise where a hunter has never trod. But night was fast coming on, the rain was beginning to fall, and it was a long walk to the hotel.

Seeing a house across a field on the "Missouri bottom," I went to it, knocked and asked the lady of the house for supper and lodging. She said they had not room, but sent me to a fine house in a cottonwood grove by Beaver Creek. I feared that the house belonged to a man who was wealthy and selfish; but, as I approached, a tall, pleasant-looking gentleman came out on the porch, smiled, and greeted me as if I were an old friend whom he was expecting. I found that this man was Mr. Beatty, one of the few of Montana's pioneers who possessed steady habits and was prosperous. I was given a fine room, the board was the best, and I could well have wished that I might find enough remains of extinct animals to keep me at work there all summer. But, alas! though these were the



CAMP OF THE FOSSIL HUNTERS ON MAGPIE CREEK.
At the foot of Fossil Hill near Canon Ferry,—about twenty miles east of Helena, Montana. Pile of boxes of fossils between wagon and tent. "We had a good camping place."



"WITH A TEAM OF CAYUSES, ARCHIPPUS AND A CAMP OUTFIT WE DROVE TO CANON FERRY."

best exposures of the White River beds (named from White River in South Dakota where the deposits were first explored) I had seen in Montana, and they were thousands of feet in thickness, I searched in vain for the smallest fragments of bone, though there were some impressions of leaves and portions of petrified trunks of trees in the rocks.

I wished to cross the river, and the nearest bridge was some distance away, but on Sunday, Mr. Beatty's son and family came visiting from over the river, so I had an opportunity to return in a boat. I had previously returned to Winston for my camera, and my outfit now consisted of this, a pick, and a sack containing cotton and paper for wrapping specimens.

I stopped over night at a ranch-house on the long sloping bench-land about half way between the river and the Belt Mountains which bound the valley on the east. The next day I bought, for $30, a horse, old but gentle, and an old hornless saddle.

After searching the ravines and bluffs for a day or two and finding little except a jaw and some teeth of ancient horses, I tied my pick and sack to the saddle, put the carrying strap of my camera over my shoulder, and started—not exactly "sallied"—forth. I began working my way northward up the valley—"working" is the correct word, for my horse (I named him "Archippus," which is the Greek for "ancient horse") was slow, his youthful hopes and ambitions having changed to a gentle, meek, submissive endurance. On the right, the broad bench of Tertiary deposits sloped gently up to the bases of the Belt Mountains. On my left, toward the west, was the river valley, beyond that the badlands which I had recently examined, and beyond those the Spokane Hills. For hours we travelled over these smooth, sloping benches, but there were few good exposures of the underlying Tertiary sands and gravels.

Near evening the scene began to change. The road descended from the high bench and made its way along the foot of the bluffs, between them and a long lake. There were here quite extensive exposures of the Tertiary rocks. At last I passed a high mound or projecting portion of the bluffs which looked as if it might contain buried animals; but it was too late to examine it that night. At dark I arrived at a little old stage station named Canon Ferry, in a little canon beside the river on the stage road from Helena to White Sulphur Springs. The canon is still there, but the "ferry" has been replaced by an iron bridge, a

dam has been built across the canon above the village, making the long lake which I have previously mentioned, and a large electric power house, with wires going to Butte and Helena, has been constructed on the west side of the river opposite "The Ferry."

The next morning I went early to the bluff which I had passed the previous evening, climbed up its steep front, and was looking carefully along a perpendicular bank when I suddenly became aware of a long face imbedded in the rock and looking out at me. A fossil-hunter is as happy when he finds a good skull as a hunter when he kills some rare animal, but with the former the story is not all in. There are still the questions: Are there more skulls and skeletons to be found? Is the animal some species that has been described; or is it one that man has never seen before? Does it reveal something about the past life of the earth that no one has known? You shall see in this story how the answers to these questions are actually worked out.

I searched a part of the bluff and saw, in several places, portions of skulls and bones projecting from the soft rock. I plainly saw that it would pay to come to this place with team, wagon and camp outfit, and I estimated that it would take about two weeks to dig out the fossils. These beds were plainly of Miocene age, but I found that the much older White River deposits here contained fossils also.

From this place I rode to Helena, and then to the North Boulder Valley, near Cold Spring Postoffice, a distance of about seventy-five miles, where I found another place which contained bones of Miocene Mammals. From here I went southward to Pony, a little "long town in a long valley" of the Jefferson range, and then westward to the Lower Madison Valley, to get my team and camping outfit which I had left there the previous year. When I went to Logan to get a man to assist me, Mr. Rowland, the merchant there, said: "I've got just the man you want for such a trip." So I engaged him and an old friend who was passionately fond of hunting specimens and who wished to get a little outing.

Before leaving the Madison Valley, we dug out some fossil fish from gray shales in the bluffs on the east side of the valley, and the neck and skull of a large species of camel which afterward proved to be new to science. The bones were imbedded in a fine cream-colored sand which was deeply covered with river-gravel. In another place we found the rock in a cliff covered with leaves that had fallen from old trees by an old river many thousands of centuries ago. In



"THE OLDER WHITE RIVER BEDS NEAR CANON FERRY,
Where we found bones and teeth of ancient mice, dogs, rhinoceroses and little three-toed horses."

these beds I had previously found ancient squirrels, dogs, three-toed horses, rhinoceroses, oreodonts, deers, camels, mastodons, turtles, clams, and petrified trunks of trees, but no leaves had been found in these deposits before.. They show that the forests of the region of the Rocky Mountains were more like those of the Mississippi Valley to-day.

From here, with a team of cayuses, Archippus and a camp outfit, we drove to Canon Ferry, and established camp on Magpie Creek at the foot of the bluff, which on account of the number of fossils which it contained we came to designate as "Fossil Hill." Almost every day, as we ascended the hill we found new skulls and parts of skeletons so that we at first discovered them much faster than we could dig them out. We had a good camping place. There was abundant feed for the horses, and when at noon or evening we returned to camp we brought dry cedar wood for camp fire. We built a table in the shade of the willows, and we had a summer's outing with a zest. My assistants, Mr. Roberts and Mr. Hutchinson, were genial companions, and all that could be desired in every way. Our days were filled with fascinating labor and our nights with refreshing sleep. Our present surroundings were varied, picturesque, and possessed the charm of novelty, and the whole scene was pervaded by the atmosphere of the past into which we were getting new glimpses.

Instead of spending two weeks there we spent six, digging out fossils and trying to learn more of the ancient history of the region. Box after box was filled with the finest specimens, most of which belonged to an extinct family of Mammals called oreodonts,—animals which for ages appear to have swarmed over the western part of our country, and undoubtedly the eastern also, though conditions were not favorable there for their preservation.

We not only collected fossils from Fossil Hill and the adjoining bluffs, but from the older White River beds, near Canon Ferry, where we found bones of ancient mice, dogs, rhinoceroses and little three-toed horses. These beds are undoubtedly hundreds of thousands of years older than the Miocene beds at Fossel Hill; but just overlying the White River beds a little below "The Ferry" are placer-gravels, from which have been washed out not only gold but remains of elephants and bisons. These fossils show that the beds are vastly newer than the Miocene.

After leaving Canon Ferry, we went to a place between the Missouri and



"A LITTLE BELOW 'THE FERRY' ARE PLACER GRAVELS."
"From these have been washed out not only gold but remains of elephants and bisons."



A PLACE BETWEEN THE MISSOURI AND PRICKLY PEAR VALLEYS.

Where we found remains of Titanotherium, ancient tapirs and three-toed horses.

Prickly Pear valleys, where we found some remains of Titanotherium (huge or giant beast), ancient tapirs, and three-toed horses. Then we returned to the Missouri River east of Winston, near where I had begun my trip on foot. We made our last camp by the Missouri in a beautiful spot, and each morning we went across the river in a boat to the Miocene deposits, where we found



EACH MORNING WE WENT ACROSS THE RIVER IN A BOAT TO THE MIOCENE DEPOSITS.

bones, jaws, and part of a skull of a new species of three-toed horse. We then went to the Boulder Valley near Cold Spring, then to a place near Whitehall, and then returned to the Madison Valley, where our expedition ended..

It would take too long to tell all the results of this summer's work, but we sent east between twenty and thirty boxes filled with precious fossils. We had supposed that we were getting extra fine skulls and parts of skeletons of animals that had been found before; but as the boxes were opened and the bones were cleaned from the matrix and compared with those already known, it was found that nearly all were new to science, and almost every specimen added something to our knowledge of the life of the past.

A number of the new species have been figured and described, and it may be interesting to know that the skull which was first found partly weathered out of the bank on Fossil Hill was made the type of a new species—that is the first specimen of a species to be described—and this specimen with several other new species collected during the summer are now mounted and on exhibition in the Carnegie Museum..

Perhaps sometime the reader will have an opportunity to know more about these animals themselves.

OUR EASTERN CALLA LILY.

Take a walk in the suburbs of any eastern city or village, and descend into the lowlands, during the months of March and April, and you will find in full bloom a profuse growth of our eastern "calla lily." Now, I confess that the term "calla lily" for this particular plant is original. I am aware also that we have a real, local, swamp calla, the water arum *Calla palustris*. I have never heard anyone else apply the term calla to the plant to which I now invite your attention, and I neither desire nor expect that it will be adopted in the next revision of our standard botanies. Yet, pardon the soliloquizing in print, there would really be as much reason for adopting it because of its use in this article, though in quotation marks, as there is for seriously adopting the revised nomenclature of some of the Latinized botanical names. Possibly some learned botanist, a hundred years from now, probing among the files of this periodical, will discover that this is the first use of the name, and therefore, on the doctrine of priority in nomenclature, will henceforth adopt it as the only true, authentic and original title. (Strange what a mass, confusing to the beginner, there is of first names, and original names and priority of names. But that is another matter, and to prevent any



"THE EASTERN CALLA LILY"—THE STURDY SKUNK CABBAGE.

During the months of March and April, you will find in full bloom a profuse growth of our eastern "cally lily."



CUT OFF THE FRONT OF ONE OF THESE ARUM SPATHES.
Turn it down and see the wonderful, short-stalked spadix entirely covered with perfect flowers crowded together in a mass of bloom.

further addition to the already portentious category of names and synonyms any claim to originality is hereby once and for all disclaimed. If anybody objects, not only to the objection but to the imitation, let him speak now or forever hold his peace!)

But to return to my "calla." I find it in our swamps and marshes in full bloom in March and April. Three thousand miles away, wild in the lowlands and profuse in cultivated gardens, I find growing, in the month of March, the next door neighbor, the *Richardia* No. 4 Arum of Gray's "Field, Forest and Garden Botany," the cultivated calla lily, with its "pure white spathes" that brightens the field of California, our eastern homes and our churches at Easter.

The plant whose praises I sing is No. 5 of the same botany, the *Symplocarpus*. The two callas are twin sisters of the Arum family. One might easily raise a claim on the point of color that the purplish-green spathe of the *Symplocarpus* is not so remote, color-wise, from the typical lily as is the plain white spathe of the calla commonly so-called.

Now, once and for all, say and have done with it, all the bad things against the plant that you can think of, and I will take my turn at eulogizing it. Our purplish-green *Symplocarpus* "calla lily" does smell rather "strong," a little *foetidus*, and later in the year its vigorous leaves, a foot or two in length, may, if the imagination has been excited by active practice over the modern nature story, suggest a recollection of the plebian cabbage of the truck-patch. In brief, it is a skunk-cabbage. But what is in a name? Called a "calla lily," it still smells as aromatic, the colors are as strikingly variegated, the leaves as luxuriant and the structure as interesting.

But come near the plant. Let not its common name nor its uncommon perfume prevent you from making its otherwise delightful acquaintance.

In the first place, it is courageous and encouraging. It strives so hard to drive the snow away that it pushes through the wedge like edges of the snow bank that borders the cold pool. Even in midwinter the spathes point an index finger toward the coming of spring. The plant is so human like in perseverance that it wins our sympathy. I wish I could rename it *Sympathycarpus felicitous*—its sympathy makes us happy

Said a naturalist to me in California, "Don't you think it wonderful that our calla lilies and other flowers bloom so well out of doors?"

"No," I replied. "If they didn't bloom

in this climate, they should be ashamed of themselves. Anybody, anything, can bloom with favorable surroundings. Our Eastern arum can bloom in spite of obstacles. If the emblematic, rather than the æsthetic, were the point of view, we would decorate our pulpits with the skunk cabbage rather than with your calla lilies."

Perhaps my Californian was justified in being puzzled to know whether he had met a philosopher or a lunatic. It was the former if he took everything into consideration; the latter, if he judged only from his own point of view.

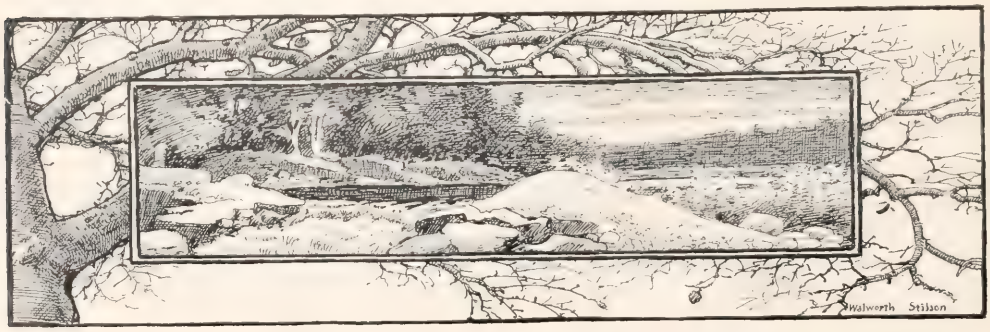
If honeybees in April could philosophize they would regard human beings, in shunning the *Symplocarpus,* as lunatics. For to the bee, the pollen of the skunk cabbage in early spring is vastly important. It starts the brood-rearing a little before any supplementary help comes from the red maples.

Cut off the front of one of these arum spathes, turn it down and see the wonderful, short-stalked spadix entirely covered with perfect flowers crowded together in a mass of bloom. What a store of good things,—really a treasure house from which the bee takes a few of the "gems," and does work that must be done, which the plant unaided cannot do. The bee does a great and powerful deed for small pay. In exchange for a few grains of pollen, the plant will soon show a liberal fruitage in a globular mass of botanical socialism. Hence the name—*symploka,* connection, and *karpus,* fruit. The fruitage is connected together into a great compound ball that ripens in September. At that time it stands boldly upright, taking every possible advantage of the sunshine and of the air currents in bringing to full ripening and perfection the bulb-like seeds within the fleshy globe.

Gradually old age comes creeping on, and death approaches. Slowly the matured plant bows to the inevitable, and when the cold weather arrives, falls, as we do, perhaps, and after "earth to earth," for a time, rises, as we shall, revived and newly created. The bulblets go floating and bounding away on pool, pond and brook, to colonize other marshes and to beautify other mud flats with our eastern "calla lilies."

As you go on suburban walks in early spring, look for these sturdy little life-messengers, the advance guards of a floral army of *Symplocarpus,* the skunk cabbage, universally despised, because universally unobserved or ignored. In its way the *Symplocarpus* is as beautiful as the spiny fruit of the Malayan Durian; and if you neglect and despise the flower of the one, you would, even in these utilitarian days, probably reject and condemn the fruit of the other,—"the delicious Durian with its intolerable odor." If you ridicule me and other botanists, for admiring the skunk cabbage, to be consistent, when you travel to the Malay Archipelago, you must disdain the luscious contents of the Durian fruit, and ridicule those, who, with spoon in hand, although perhaps at arm's length, devour the vegetable custard, and, as they cry for more, call it food fit for the gods.

The seeds of the *Symplocarpus* will, as you investigate their complex structure, make you a better botanist, and, as you learn of their courage, their sturdiness, their ability to overcome obstacles, they will send you from the marsh a stronger, better, more hopeful man or woman. And that will not be the least important part of their teaching..





The garden, floriculture, domestic plants, suggestions for "the grounds beautiful,' inexpensive greenhouses, gardens for young folks, hobby houses in the back yard, etc.

PECULIAR ACTION IN CALLA LILIES.

BY JOHN C. UHRLAUB, "RIDGEWOOD," GLENBROOK, CONN.

I send to you specimens of calla lilies grown in my greenhouse. The bulbs were planted last October. Through some accident in the heating apparatus the temperature in the greenhouse was below the freezing point, and the foliage of the plants perished. The bulbs were transplanted into another house and took a long time to recuperate. By careful nursing and rich fertilizing they at last developed most luxuriantly, and in some cases over-developed. I have had one perfectly *double* flower, and eight specimens like the two sent you, in which an ordinary leaf had turned into a semi-flower though in each instance not even rudiments of the propagating organs had appeared. In a few instances leaves appeared which showed only white points or stripes, or half the leaf turned white; in a few instances the semi-flower showed the characteristic curves or undulations of the flower, while in others the pseudo-flower was perfectly smooth like this. In each instance the pseudo-flower appeared on the same stem which bore a perfect flower also.



THE "FALSE" FLOWERS WITH "TRUE" FLOWERS.
It shows that the relationship of flower to leaf is very close.



The pets, poultry, pigeons, dogs, cats rabbits, cavies, honeybees, etc., etc., too numerous to mention.

WHERE IS THAT EASTER RABBIT?

At Christmas it was not sufficient to tell the young folks that St. Nicholas was a bishop of Myra who died in 326, that he is a patron saint of boys, that the young folks all love him, that he is the original of the Dutch Santa Klaus, and that for centuries his name in many nations has been emblematic of gifts and a season of special merriment.

More was demanded than mere *fancies* of "jolly old St. Nicholas," so warmed up by white furs, red coat and merriment that he radiated warmth of heart everywhere. The young folks insisted on seeing the real thing. So you selected the jolliest, kindliest, elderly man that you knew and dressed him in the historical garb so that a "real, live St. Nicholas" might be present.

But suppose, for only a moment, that instead of selecting a kind-hearted man, you had put before that group of expectant, bright-eyed, laughing children a St. Nicholas made as the farmer makes a "scarecrow man" for his cornfield; only clothes with lifeless filling. How much less the pleasure, even if custom had led the young folks to expect nothing better! In this day of real things and of increasing interest in children, inventive, up-to-date parents, teachers and pastors would have said, "Let us improve on these stuffed coats of the past; let us put in a real, live, jolly old fellow."

Now what St. Nicholas is to Christmas, the rabbit (or hare, originally) is to Easter. Both associations had their origin in Germany and Holland, those lands rich in folklore and in kindnesses for the "kinderkins." The young folks in these lands are as familiar with rabbits as they are with fat and jolly old men.

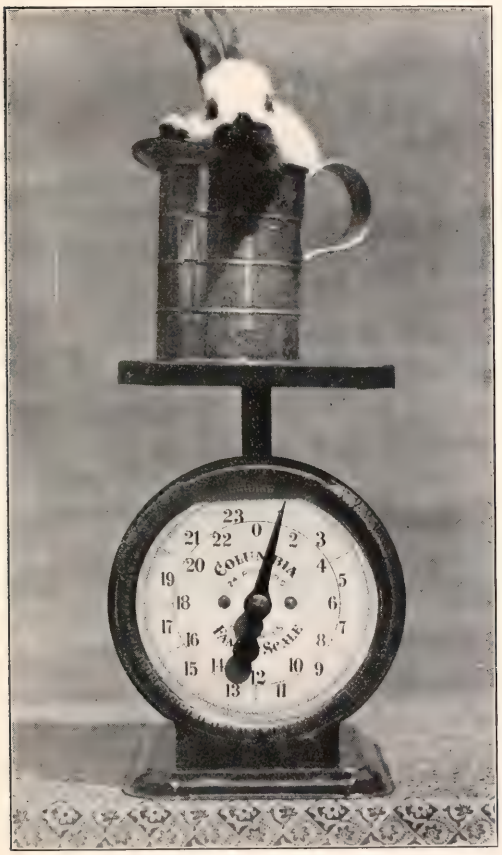
We imported the idea of a jolly and aged man of amplified girth to impersonate the spirit of gifts for good children, and it has been universally successful. And incidentally let us note that this success is a testimonial to those of us who are well along in years and who push the scales down furthest. Rotundity and jollity are proverbially congruous. They never seem out of harmony.

Now let us have for Easter more of the real rabbits and fewer stuffed, filthy skins and nauseating, unhealthful, cheap candies in rabbit form. Let us go back to first principles and learn why we have these rabbit images.

In Germany and Holland, the rabbit for Easter is almost as important as St. Nicholas for Christmas. Children are taught to believe, that if they are good, and obedient to their parents throughout the year (and especially for a short time before Easter), a rabbit will creep into the house when everybody is asleep and secrete a large number of beautifully colored eggs in all sorts of places for the pleasure of these good children. That day the fat and jolly mother is mysterious and smiling.. She goes tiptoeing and pointing slyly as she walks about the house. "Sh-h-h, don't frighten away the rabbit. She's coming with some eggs for you to-night if you are good to-day. Then she goes marketing with a basket of larger size than usual. But the children do not notice that—they are so intent on being "good" and watching for the special rabbit. With rabbits in general as an embodiment of all good interests, for children they are thoroughly familiar. Next to a rotund parent, their favorite pets are the known good things, and it is natural tnat their two best holi-

days should be so closely associated in fancy with these dearest things.

The mother brings home a large supply of eggs in her basket. But the young folks observe not the larger basket nor the astonishing supply of eggs. Has Gretchen been good? Was Hans naughty? These little minds have been agitated for days by these questions. Will the highly idealized specimen of their favorite pet come that night? It is a long time after the children have been tucked up in bed before they can



"A PINT'S A POUND,
THE WORLD AROUND."

get to sleep. They are watching for the rabbit. The mother calls to them from the kitchen to lie very still and listen. She doesn't want them to come running out into the kitchen, for she has piles of eggs in every direction, and a variety of dyes. Some are boiling on the stove and others are piled on the table or in dishes of all sorts and sizes. What a display of colors! Blue eggs, green eggs, red eggs and variegated eggs—all the colors of the rainbow and many more.

What an astonishingly prolific and versatile rabbit to lay such quantities of eggs in such a variety of colors, *all in one night.*

When the eggs are boiled and colored —and, more important, when the children are asleep—the parents take the eggs and go stealthily about the house and put them in all sorts of hiding places. What an astonishing rabbit! It can lay an egg on top of a beam in the attic as easily as in a tub in the cellar. It has a special preference for odd corners, and it never ignores boots nor shoes. Then the chuckling couple tiptoe into the kitchen and there leave baskets and pans. With an occasional warning "Sh-h-h," as one thinks the other's chuckling is too loud, they go to the bed, turn down the quilts and take a peep. Yes, the "kinderkins" are still fast asleep! It was successful.

Perhaps the parents then go out to a beer saloon for refreshment and music. Occasionally they laugh uproariously and slap each other. Can it be possible that the music or two glasses of beer or the clink of mugs can have such effect? No, the parents have been describing to a neighbor some of the queer places in which they have hidden the eggs, and how funny it is that the "kinderkins" will think that the rabbit laid them there —especially as a reward for goodness! In the morning the children go searching for the eggs. They may have doubts even as to their own goodness, but every twinge of conscience is set at rest as they pounce upon egg after egg and, with shouts of joy, drag them to light.

It was easy to believe that St. Nicholas was the personification of a jolly provider for the household, and that he supplied welcome gifts to little children on the holiday of the Christ-Child. But not so self-evident is the associating of a rabbit with the Resurrection. The explanation, however, is not occult. Easter is a moon holiday, its exact date depending on a certain phase of the moon. From earliest history the rabbit has been an emblem of the moon. Perhaps this

is because the doings of wild rabbits or hares, which are most active at night, are visible only in the light of the moon. Perhaps also from a primitive and occult myth which refers to the alleged ability of the rabbit and of the moon to change its sex at will. Exactly what this teaching was, it is now difficult to determine. All we know is that ancient literatures contain subtle references to it.

But, to me, the most probable explanation is, that the German or Dutch father considered himself to be an emblem of the things best fitted for his children's pleasure on the church's principal holiday—especially from the child's point of view. To that emblematic and idealized self, he gave the name of a bishop famous for his kindness toward children. I have often wondered why the father did not allow the mother to be an emblem of good things as a secondary holiday. But it seems clear to me that he wanted no human competition in that child's making of an idol. So he took the other best living thing in the household—the child's favorite pet. For what child anywhere on earth (not alone in Germany or Holland) doesn't love a "bunny?" The rabbit is the ideal of all lovableness among four-footed animals. And rightly so. It stands on its merits. It is always lovable. For what other four-footed pet can you truthfully make the claim of no uncleanly habits?

So the rabbit at Easter represents love. But what about the absurd claim that it lays eggs, and, worse yet, that in one night it lays an enormous quantity of colored eggs? Easter is a springtime holiday at the very beginning of plant life, when miraculous transformations are made in a short time. The children's interest in these sudden bursts of plant life are chiefly centered in the variously colored flowers. Easter stands at the beginning of a renewed life, and of that there is nothing more emblematic or more realistic than an egg. Easter stands for love to mankind and for a new, sudden, miraculous reappearance of life. Springtime means all this, in the plant life, with the addition, especially noticeable by the child, of a variety of colors.



"CELESTIAL," A BLUE DUTCH, AND HER FAMILY.
Vastly better "display" for Easter than the monstrosities of show windows.

The German and the Dutch mind delight in absurdity. The bigger "whopper" the "fader" can tell the children and the more firmly he can make them believe it, when it is for their present enjoyment and future improvement, the more jollily he shakes all over with his laughter. That is why he made St. Nicholas ride in mid-air and not on the ground, and tumble down the chimney instead of walking in at the door. That is why he has a rabbit suddenly lay so many colored eggs in all sorts of places.

He set out to portray to the child's mind these fundamental principles of Easter—love and a sudden, miraculous renewal of life. As emblems he selects their dearest pets for the love, eggs for life, and the many colors of the flowers for newness. But the parent cannot preach a juvenile sermon in a solemn way. He must get fun for himself as well as for the young folks. And he fully succeeds in the ludicrous, incongruous mixing of things, in association with the mysterious, and with a lively game of "hide and seek."

The unfortunate phase of it, especially for American children, is that the custom was brought to this country by toy makers and confectioners instead of rabbit breeders. When the real, live rabbit is left out, the essential part—love—is no longer represented. This is as absurd as would be a wooden image of St. Nicholas for Christmas.

There is still another unfortunate thing about it. When the custom arrived in this country, it got entangled in a rabbit myth, originating among the ignorant and superstitious negroes of the Southern States. As most of our readers probably know, the claim of the colored man is that there are peculiar talismanic virtues in the left hind foot of a rabbit killed in a graveyard on a moonless night. Ough! As if there ever lived a superstitious negro who would try to capture a rabbit in such circumstances. As well might one give a receipt for flying, Pick up a pebble on Mars and carry it in your pocket; or this infallible remedy for keeping cool on the hottest days in summer, Carry in a locket a sliver cut from the North Pole.

But unfortunate as it is, the foot of the weird graveyard rabbit has become associated at the stores with stuffed images of rabbits and with monstrous compounds of rabbits and eggs made of colored candy. Away with all this degenerate, silly trash. Let us come back to a real, live, lovable rabbit and to fresh, wholesome, hens' eggs well boiled, and colored by a variety of suitable dyes. These are not only harmonious and appropriate, but, as Easter emblems, they are excellent, æsthetic and enlivening.

Eggs are usually plentiful and lower priced at Easter. A few cents' worth of dye will color a bushel, if you want so many. A little care and slight expense will readily provide the rabbits. As with Lowell who would rather have one live bobolink than a square mile of printers' ink, so to my mind a hutch with one or two live rabbits in it is worth more than a whole show-window full of the ordinary, Easter desecrations and misrepresentations. To care for one live rabbit will inculcate active, unselfish love in a child, and do it vastly better than will heaps of toys and hills of candy trash. The rabbit will require regular but not tiring nor extended care. The rules are extremely simple. Water once a day; remove the water after the rabbit has had all it wishes to take; put a little salt in the water once a week; keep a supply of good hay in the hutch all the time. After watering, put in a small supply of oats or a little bread. Once a day give some form of vegetables or some green grass (without dew on it). Carrots are the favorite. Vegetables and apple parings are relished. So are celery leaves, lettuce, corn husks and cobs.

Yes, the Germans and the Dutch are right. The rabbit is the best pet for the "kinderkins" at Easter—or at any other time.

If you think the prospects of your rabbits really laying eggs are not promising, try a hen. That, of course, will lead to chickens—the most lovable, squeezable (but do not do it) birds in existence. Then complete the outfit with a few plants for the young folks. What a lovable combination of life—"bunnies," "chickies" and flowers. These are the ideals for Easter—love and life.

P. S. Special information regarding rabbits will be given by the writer, if inquiry is accompanied by stamped and self-addressed envelope. Address Edward F. Bigelow, Stamford, Connecticut.

This, then, is a magazine of "what I have done and seen," rather than "what I have heard and read."

EDITORIAL

OUR INTRODUCTION.

"Labor with what zeal we will,"—it is really surprising how many things remain undone. And yet, for the first number,—well here it is, without editorial eulogy or apology.

The best explanations of what we propose to do will be found in this and succeeding numbers, and we hope the best eulogies will be the comments of our readers.

As to apologies,— we have none, though they may be needed. Words are not the only means of atoning for shortcomings.

PERSONAL.

My presidency of The Agassiz Association and my editorship of its official magazine, "The Guide to Nature," is neither a profession nor a business. It is a labor of love. It is not accompanied by salary, nor by remuneration of any kind other than the joy of doing good work, but in this I am well paid.

Every cent received is used to pay the society's bills, whereby it and its work are made better. No salaried officer is connected with the Association. Every one gives time or money or both to advance and improve the work. This and much more is fully explained in the Manual of the Association, a copy of which will be mailed to any address on receipt of ten cents.

The following announcement was made to contributors in the Prospectus:

"From the first issue "The Guide" will pay for contributed articles and illustrations. The rate, at first moderate, will be gradually increased with the prosperity of the magazine. Reports, letters, inquiries or matter of personal nature will, of course, not be paid for, but original articles and illustrations that may be available will be bought."

The amount offered will be small, and it is hoped that even this will be used in purchasing membership, subscriptions, or contributed directly to the work of the Association. I firmly believe that a magazine with the ideals and scope of "The Guide" is needed and never more so than at present. I invite your co-operation.

"WHAT'S THE NEWS?"

Every little village, even if of only a few hundred inhabitants, has one or more newspapers to chronicle the latest happenings. If Groceryman James paints his store, if Farmer Brown buys a new horse, or if Miss Jenkins from the great city is visiting her Aunt Matilda, it is duly set forth in type. As even the little village has its disseminator of news, so has every organization, political party, guild, church and lodge. If High Mighty Mogul Mosper makes a speech at the installation of certain officers, or if he is the chairman at the banquet of the Ancient Order of Cave Men, his words are heralded far and near in the lodge journals.

But let a polar bear die in a zoological garden, a toad of uncertain age be found

in a western mine, and the newspapers sensationalize the affair. We believe that scientists, naturalists and the "general reader" want the truth set forth by some one who knows and will not distort. This is to be an important mission of "The Guide to Nature." It shall direct to the latest and best things in nature, in discovery and research and in occurrences of general scientific interest. To that end, the editor appeals to every reader to become "a reporter." Send at least a notice of the event with the address of some one who knows the facts and from whom particulars may be obtained.

"The Guide" is a magazine of nature literature and of news from nature.

Every article, item or comment in the magazine, not otherwise credited, is written by the editor or by some of his assistants under his personal supervision.

NAMES RATHER THAN CHARACTERISTICS.

Mr Willard N. Clute, editor of the American Botanist, in a letter to the Nature Study Review makes this very important suggestion:

"I ask whether many of the adults who claim to be interested in nature are really so. How many do you know that are enough interested in nature to prefer the study of it to other things? How many who study nature by themselves and bring home no specimens? Mighty few, I'll warrant! I have been trying for seven years to get our people to take a real interest in plants by publishing all the curious and remarkable things about them that I can find in books, the periodicals and the field; but to very small avail. Meanwhile Dana's "How to Know the Wild Flowers," which guides one to the names of his specimens, has sold 65,000 copies. How many of our students of botany do you suppose keep up the study after they leave high school? Not many."

What is wanted, as Agassiz said, is "Study nature, and not books." Know the things, not catalogues of names.

A TENDRIL SOLILOQUY.

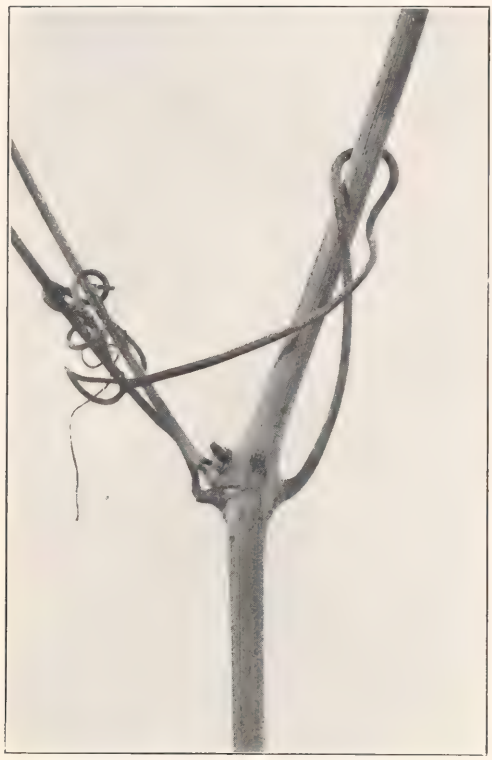
I sat on a crumbling stone wall at the edge of a swamp, with my camera and collecting box at my side. I was tired. I had been tramping for miles, but in the last half hour had found little of special interest or value. Perhaps that made me pessimistic, for my thoughts ran in a "Persian Garden" style. I felt like asking myself, as the old farmer had asked me an hour or so before, "Have ye lost anything, Mister?"

Seriously, let me introspect, let me



"HOW MUTUALLY HELPFUL, HOW EACH SUPPORTS AND IS SUPPORTED TOWARD A LIFE THAT SHALL BE HIGHER AND BETTER LIGHTED."

This reminds me of many "missionary," hard working students and lovers of nature.



"BUT YOU, STRAGGLER, WHAT ARE YOU DOING?

"Oh, I just make collections for my own pleasure. I do not care about other people."

form a "Rubiyat" of only three words, "What's the use?" One can be selfish, even in the love of nature. Are all these miles of communion with nature, is all this physical weariness endured for self or for the good of others? How will the world be made happier and better by my labor? Which is the more commendable, to help self, or to help others?

At that moment my eye was attracted by a clambering grapevine with a profusion of tendrils. How mutually helpful, how each supports and is supported in the climbing toward a life that shall be higher and better lighted.

But you, straggler, what are you doing? Only clinging, intertwining for self.

O foolish tendril! O unhappy vine! you cannot reach highest happiness for self or others in being an individual.

No other tendrils have intertwined so gracefully, so firmly,—but it is all lost, for you are only acting for self.

O foolish tendril! You neither support nor are supported. I believe that you are unhappy.

No others have struggled harder, but by your selfishness you have lost your own happiness, and have added to the burden already borne by the vine.. O foolish tendril!

CORRESPONDENCE AND INFORMATION

SOME ASTONISHING EXPERIENCES WITH FOXES.

A Fox in the Kitchen.

Margaretville, N. Y.

TO THE EDITOR OF "THE GUIDE TO NATURE":—

I was visiting my parents on their farm in this vicinity, and as breakfast was being prepared, my mother aroused us with the startling information that their was a fox in the back kitchen. We thought at first that she must be mistaken, but peeping through a window we saw a fox snugly curled up on a pile of burlap bags near the door that led to the living rooms. The doors and windows were quickly closed, and father went to the cellar and secured an empty barrel which he succeeded in placing over the fox.

The door of the room in which the fox had wandered had been left open all night, and it was the opinion of my parents that the animal had been hard chased the day before by the hounds and had sought shelter there. Several hounds had been heard on the hillside. We kept the animal for some time and

then gave it to a summer boarding house keeper, but it escaped from him by jumping through a large window and is probably still at large.

Yours truly,

CLARKE A. SANFORD,

Editor of "The Catskill Mountain News."

Fox on a Veranda.

Griffin Corners, N. Y.

TO THE EDITOR OF "THE GUIDE TO NATURE":—

With great pleasure I will try to inform you of the facts concerning this singular hunt. It was in the early part of December, 1907, and there was about four inches of snow upon the ground. It was a warm day for that time of the year. The surface of the snow was a little moist, but underneath it was dry and sandy. Under these circumstances it was much more difficult for a fox to travel than for a dog. I am always interested in hunting and was out that day, standing upon one of the short ranges of the Catskill Mountains known as Burnt Mountain. The position which I occupied gave me a fair view of the valley and surrounding hillsides. I saw the fox coming across the valley, but saw at once that he would not come within my range. I had a dog with me which is very fleet, and had caught foxes before by fair running. I at once showed him the fox and the race began.

My dog, being fresh, was soon near the little animal, and it was wonderful indeed to see how the fox tried to evade his pursuer. He made his way through jungles and brambles, sometimes on a fence for a certain distance, then again taking to the open fields. But the strength of the dog was holding out better than that of the fox, and he at one time almost reached him, but the fox scaled a high stone wall, and this scored a point on his pursuer. They had now reached a point at the top of a hill and the fox made directly for a nearby farmhouse. They were now very close together, and the frightened little animal rushed upon the porch of the house, while the dog was at his heels. Here the tired creature made a second stand for his life, and faced his pursuer for battle.

Two young ladies who belonged to the family now came to the rescue, and with broomsticks and other weapons began to make peace. It was not long before the tired and frightened little fox was surrounded with warm, comfortable wraps. Restoratives were administered and care of the best kind was offered, but the fright, together with the severe race had overcome him to such an extent that he soom died.

Respectfully yours,

J. E. BELLOWS.

Fox in a Silo House.

Andes, N. Y.

TO THE EDITOR OF "THE GUIDE TO NATURE":—

The first that I saw of the fox he was running down the road with my coon dog after him, and he took him about ten rods. Then he left him and the cow dog took up the chase. The fox crossed the brook and started for the woods, but the dog was so close behind him that he could not get there.

Then he started for the sheep house, and ran around it three times. He came back down the hill across the brook again; then he stopped and the dog ran by him, and the fox started for the woods again across the brook. He tried to run on the wall going to the woods, but the dog headed him off again, and then he ran around the sheep house several times.

He recrossed the brook again and started for the hill on the opposite side. He would run a ways and then look behind him to see where the dog was. He ran perhaps fifty rods and sat down on the wall, and then he started and ran again trying all the time to get to the woods..

Then the dog overtook him and headed him off, and the fox came right straight for the cow barn.. There is a large silo back of the barn, and between the silo and the barn there is a shute to convey the ensilage to the manger. And in this shute is a large crack about seven feet from the ground, and he jumped through that into the shute and lay very quietly, and then I killed him.

Very respectfully,

FRANK BOUTON.

THE CAMERA

INTERESTING LAKE AND CLOUD EFFECT.

BY S. ELLIS HEATH, PEEKSKILL, N. Y.

This photograph was taken at 10 A. M. I was in what is called the Tower of Victory in Washington's Headquarters, Newburgh, N. Y. It is looking south on what is known as the North Gate of the Highlands. The mountain to the right is "Storm King;" to the left lies "Breakneck;" the island seen is "Polipels;" the distant background is West Point. In the near foreground you can see gas tanks, shipyard, West Shore and Erie Railroads.

The camera used had an ordinary lens. I used 22 stop, at 1-25 second exposure, Cramer medium isochromatic plate,



AN INTERESTING PHOTOGRAPH OF LAKE AND CLOUDS.

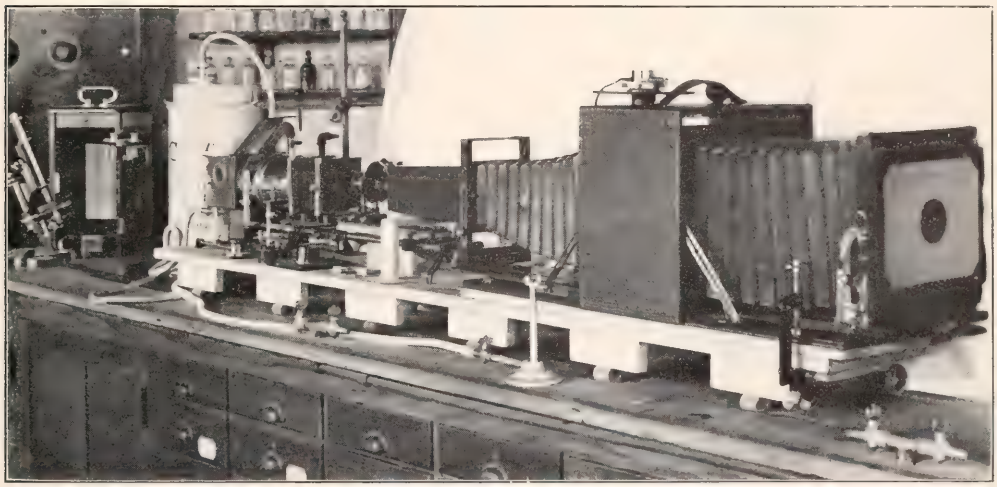
without ray screen or filter, and the developer used was mitol hydro. The development was carried just far enough to bring out the clouds, no attempt being made to get any detail in the foreground.

The secret of my success was in getting up in the tower where I could shield my lens from the direct rays of the sun.

A HOME-MADE PHOTO-MICROGRAPHIC OUTFIT.

Herewith is an illustration of a comparatively inexpensive photo-micrographic outfit in the editor's laboratory. Beginning at the right, as shown in the illustration, is a Premo camera of four feet extension front and back focus, plate 6½ x 8½ inches. In place of the ground glass of the regular camera, a photo-micro glass with clear center was obtained. A wooden tube is fitted at the front in place of regular lens and lens board. At the external end of this tube are disks with perforations varying in size, some with the society screw to take a nose piece for three projection objectives. Other discs are fitted to the regular camera shutters, or lenses without shutters. At the left of this is arranged a projection microscope, modified from a criterion optical projection lantern. An acetylene generator supplies gas for the double jet which furnished reflected light or direct illumination as may be desired. T's in the rubber tube carry gas to the side jets, for the illumination of opaque objects.

For delicate high power work, a compound microscope, shown at the left may readily be substituted for the projection microscope. The entire apparatus is mounted on a plain board with firm legs tipped by pieces of rubber tubing to prevent jarring or vibration. Under this board is an iron rod, with a wheel at the end, shown under the rear of the camera, by which the focussing is done by delicately sliding the object while the operator looks at the image on the ground glass.



A PHOTO-MICROGRAPHIC OUTFIT MADE OF PROJECTION MICROSCOPE AND PREMO 6½ x 8½ LONG FOCUS CAMERA.

Thus, at comparatively little expense, by the aid of a liberal supply of ingenuity, was produced a 6½ x 8½ camera in which can easily be photographed objects from the size of diatoms and insect scales to entire flowers and insects.

The work was done by the Bausch & Lomb Optical Company, the Rochester Optical Company, J. B. Colt & Company, and local carpenters and machinists.

BIRD HAUNTS.

BY EDMUND J. SAWYER, SCHENECTADY, N.Y.

Considering the herons, gulls, eagles, snow-buntings, and host of others, and myriad birds of the tropics, it may be said no place is too wet or too dry, too



NESTS IN OR NEAR OLD HOUSES.

The haunts of phœbe, robin and house wren. The yellow warbler nests in near by shrubs.



IN SHRUBBERY BY WALL.

Just the place to look for the catbird.

high, low, cold, or hot to have its bird or birds. The very fact that the birds inhabit woods and fields, river-shores, lakes and even the city streets and chimneys might lead the uninitiated to think one place as good as another for bird-study. Such is not the case.

However, when I am asked as to whether or not such or such a place is a good one for birds, I always answer, "Yes." I have pursued the study in a dozen states and have yet to find any considerable area without birds.

When once you have acquired the art of finding the birds, every locality will prove fruitful. To know their likeliest haunts is to know half the art of finding birds. It is not enough to know that a certain species is a woodland or a river-shore or a field bird. The wood



YELLOW-BREASTED CHAT AND MARYLAND YELLOW THROAT.

Also white-eyed vireo, brown thrasher and rose-breasted grosbeak.



RED-WINGED BLACKBIRD BY THE POND.

Little green heron nests in the maple trees in the background.

birds may be divided into half a dozen groups according to the nature of wood each group prefers; it is possible to find woods where one or more species are abundant, that certain other wood birds would entirely shun.

Grouse like hard wood with plenty of low evergreen and logs; woodcock like such a place with addition of boggy ground and water; hawks ask nothing better than the same wood, provided it have a sufficient number of large hardwood trees; while crows would prefer hemlock and pine. In the case of many species, to know only that they are with-



WHERE FIELD SPARROWS NEST.
On the ground and low in the bushes.



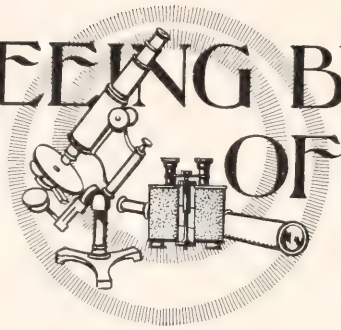
HAUNT OF THE BOBOLINK.
Builds nest on the ground.

in a certain wood is of about as much advantage as to know of a person you are seeking that he is in a certain town.

As with wood birds so it is with those of the shores and swamps. The marsh wren and the marsh hawk are not always neighbors, nor are the field plover and the field sparrow. What we need are the street numbers, as it were, of the birds we seek. Such a decided preference do many of the birds show for their chosen haunts that certain accessories become associated inevitably with the birds in the field student's mind. Thus cat-tails and red-winged blackbird naturally go together; as do the pasture thorn and the loggerhead shrike; the thistle and the goldfinch; tall grass, daisies, buttercups and the meadowlark, bobolink, field plover, and grasshopper sparrow. The names of many of the birds are taken from their usual haunts, actual or fancied. The orchard oriole, meadowlark, and wood thrush are all fairly well named. The name "bank swallow" is an infallible guide to that bird's home; barn swallow, chimney swift, and eave swallow, are equally apt names for their respective owners. On the other hand "wood pewee" is the name for the familiar little roadside flycatcher who loves nothing better than, if as well as, a shade-tree in front of our house. "Tree sparrow" is well-nigh a delusion and a myth, for the bird, when not on the snow or bare ground, is usually found among the tall weeds or bushes. "House wren" is a doubtful name for a bird whose usual home is as often far remote from as near a house.

Though seclusion is often sought by nesting birds, and by some species almost invariably it does not follow that the place most remote from human society is favored by the greatest number of birds. An ideal field would include woods and open reaches, streams and swamps. In such a place birds of very widely separated families would be brought close together in the breeding season. It is not unusual to find in many parts of our eastern states bitterns, redwinged blackbirds, swamp sparrows, meadow larks and wood-loving crows, several species of hawks, ruffed grouse, thrushes, and so on, and even phœbes, orioles, humming birds and brown thrashers, and a score of others, nesting in an area covered in a day's tramp.

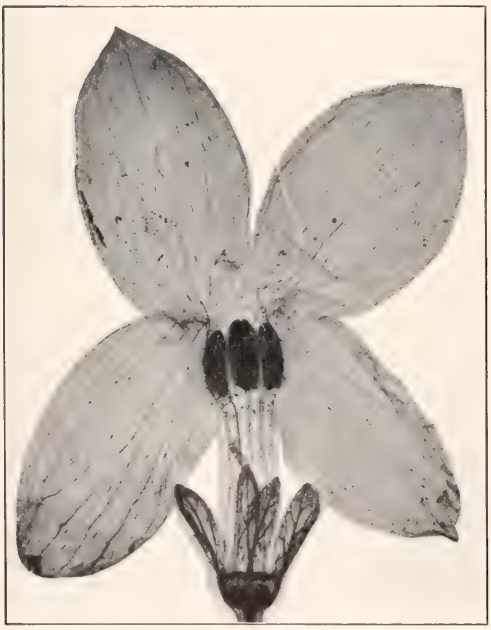
SEEING BY AID OF THE LENS



MAKING PLANT STRUCTURE TRANSPARENT.

In early spring, in certain localities, the pretty little flower popularly known as bluets, sometimes as innocence, blooms so profusely in meadows and low-lying fields, that the mass reminds one of a delicate cloud of tender blue just touching the tips of the grass blades, while in other places the flowers appear in patches and tufts "like little puffs of blue smoke along the ground."

The plant is interesting botanically be-



A BLUET "CLEARED" TO SHOW DETAIL.

cause nature has so prepared it that cross fertilization is assured. Some blossoms have the anthers set high on the corolla-tube so that they project from the throat, while the style is short, the two stigmas therefore being held within the tube. This form is shown in the photograph. In the other variety, the style is long, the stigmas projecting, while the anthers are set low and included within the throat. The arrangement makes it certain that a small insect visiting the high anthers will carry the pollen to the projecting stigmas, and that the pollen from the low anthers will be placed on the low stigmas. The two kinds of plants always grow in separate groups, which appears to be another effort to assist in cross fertilization.

The flowers are no more transparent than those of any other plant, but the reader will perceive that the photograph shows one enlarged and so transparent that not only are the ovules visible within the ovary, but the botanical structure, and even the spiral vessels forming the veins, are plainly discernible, while within and at the top of the corolla-tube, on both sides, pollen grains are so distinctly defined that they may be counted with a low-power pocket-lens. The method by which this was accomplished was until a few years ago, a mystery to those microscopists that bought the beautiful preparations from the dealers, who had nothing to say on the subject when questioned. It is possible that they were only "middle-men" and were themselves ignorant of the process of preparation, which the writer has accidentally discovered, and here repeats, hoping that the microscopical reader will find it useful, not only for small flowers, but for leaves, to which it may be applied with equal assurance of success.

The process destroys most of the color, but it leaves the structure practically unaltered and perfectly transparent, so

that the cells of the interior parts may be as readily examined with the microscope as those of the epidermis. The hair-like and the glandular appendages and the stomata are preserved in place and in structure, the protoplasmic contents alone being contracted toward the center of the cells.

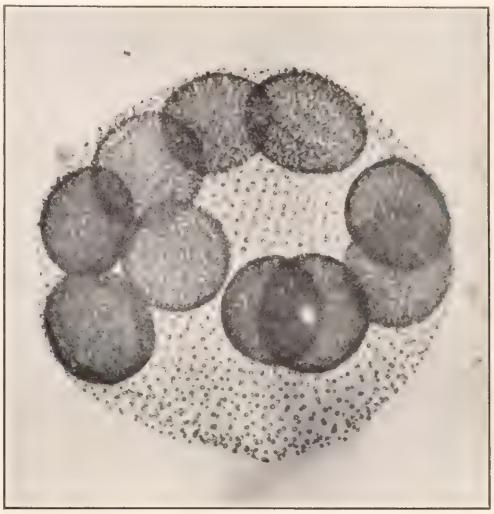
Place the petal, the anther, the whole blossom, or a part of a leaf on a slip of glass in a large drop of glycerine. See that the object is completely submerged, and add a large cover-glass. Then boil the glycerine over the lamp-flame until the parts are entirely transparent, or at least translucent, a condition that will arrive in a short time. Do not allow the boiling to be so violent as to disarrange the thin glass; let it be so gentle that the bubbles will run one by one to the edge of the cover and there break. If the glycerine should become discolored, as will often happen when leaves are under treatment, draw off the liquid, by a wet cloth, and add fresh glycerine, repeating the process and the boiling until the leaf is saturated. The use of glycerine and the saturating of the cells are the secret of the process. The saturation is easily accomplished with petals and with other delicate parts; with thick and opaque leaves the time needed is longer and the specimen may become only translucent. I have made the thick and opaque leaf of the garden geranium, *Pelargonium,* so translucent that there was no difficulty in examining the hairs on the surface, the epidermal cells, the parenchyma and vessels, with the cells of the epidermis on the opposite surface. The objects, after this treatment, must be permanently preserved in glycerine.

Petals and other parts of the flower need no previous preparation. It is well, however, to cut leaves so that there shall be two or more open surfaces to facilitate the entrance of the glycerine into the substance of the tissue. This is especially necessary when the leaf is thick or very opaque. In some delicate specimens it will not be needed.

AN INTERESTING ORGANISM FROM THE DITCH.

(Volvox globator.)

The partition wall, or dividing line between plants and animals, is narrow;



THE WONDERFUL AND INTERESTING VOLVOX.

in some instances so narrow that it is impossible to decide whether or not a certain specimen is a member of the one or of the other "kingdom," as scientific men at one time were in the habit of designating what seemed to be nature's way of dividing her creations into Animal, Vegetable or Mineral. Such divisions are even now convenient, provided we do not descend into that mysterious region where the object is both animal and vegetable, or neither.

Such living creatures abound wherever water collects, and remains exposed to the air and the sunlight. Every ditch, every pool, every mill-pond is crowded with these humble creatures, and they puzzle the naturalist who works with the microscope, and interest him beyond expression. Some may be nothing more than a drop of living protoplasm, with the appearance and the viscidity of the albumin of an egg, without a cell wall, without organs of progression, without a digestive apparatus, with only a nucleus and a contractile vesicle, yet such creatures live, move, digest food, reproduce themselves, die and melt apparently into the surrounding medium. They are

colorless, and invisible to the naked eye, yet they seem to achieve the purpose for which they were created, whatever that may be. They crawl over the ooze of our ponds, they glide up the stems of aquatic plants and hunt their prey among the submerged leaves, and themselves fall victims to other prowling creatures higher in the scale of creation, or of the naturalist's classification. Some have been bandied back and forth between the two sections, until the patient reader has begged for rest, and the lowly creatures, if they could feel the blows directed toward them, would long ago have been annihilated by the concussions.

One such, that in favorable circumstances may become visible to the unaided vision, is *Volvox globator,* now believed to be undoubtedly a plant, although its experience with microscopists must have caused the beautiful thing to dissolve in laughter, if it could know and feel.

On those rare occasions, when *Volvox* is visible to the naked eye, it is a charming object, although it is no more impressive or imposing than a green globe one one-fiftieth of an inch in diameter. Yet the little thing rises and floats and falls through the water in graceful curves, and long sweeps and sudden ascents toward the surface, constantly rolling like the animated ball that it is, and by some mysterious influence rarely colliding with any of the innumerable company of its fellows, which may fill the pond until that is made green by its presence. It is to be found during the summer months in almost all parts of the country, but rarely in great numbers. The writer has once only seen a small pond so thickly habited by it, that the water was tinted by its presence, and a spoonful lifted out appeared to be moving spontaneously, so numerous were the *Volvoxes.* But they have never since appeared in that pool. They are taken sparingly through the summer, and have been captured from beneath ice four inches thick. When *Volvox* was first observed, the discoverer decided it to be an animal, probably on account of its freedom of movement, and its activity.

When sufficiently magnified, the surface of this delicate globe is everywhere seen to be dotted with minute, green bodies that produce the faintly verdant tinge that characterizes the plant, and rather indirectly subserve the purposes of locomotion. "These peripheral cells," (I am quoting from Professor A. W. Bennett) "contain each a green protoplasm-body, varying in shape according to the age of the individual; they usually contain a minute starch granule, a reddish-brown 'eye-spot,' . . . and one or two contractile vacuoles, . . . They constitute a single peripheral layer enveloping the entire organism. . . . They have, however, as far as known no reproductive function, and in this respect stand almost alone among cells endowed with a spontaneous power of motion."

It is these surface cells that bear the two, or more especially the one particular body that lead investigating microscopists to place *Volvox* among animals. These are the vibratile cilia, by whose action the globe advances and rotates, and the contractile vacuole. None of these organs is ever visible to the naked eye. Even to see them with the microscope demands a high magnifying power; to study them properly, calls for the best and highest power lenses, careful illumination and the trained eye of a microscopist.

The cilia are delicate, colorless lashes that almost constantly beat the water, and by their action urge the *Volvox* along its graceful course. Two of these vibratile lashes arise from each of the peripheral cells, and in number have been estimated to be about twenty-four thousand. They are difficult to see, even with favorable microscopical conditions. It is only when they are quiet or at least quiescent, that the exceedingly slender threads can be demonstrated to exist.

Each seems to be nothing but a delicate, colorless filament, yet they vibrate slowly or rapidly at the volition of the *Volvox;* the movement may cease; it may be resumed. How are these actions accomplished? Are these vibratile appendages formed from threads of vegetable muscle (if I may be pardoned for so incorrect an expression as vegetable muscle), that they contract and relax at the will of their bearer? Is *Volvox,* after all, an animal with muscular filaments studding its surface? If it

is, then so are the zoospores which have often been seen to issue from the cells of an undoubted plant, and to dart through the water, urged, much as *Volvox* is urged, by the vibratile action of two or more cilia. That argument is worthless.

Another minute, motile organ contained by the green peripheral bodies (gonidia), is likewise difficult to see unless carefully looked for, and even then is readily missed, as eminent microscopists have done and have consequently denied its existence. Its presence in undoubted animals, for instance in the infusoria, the so-called "animalcules," is readily observed, and readily accounted for, as the recipient of at least some of the water engulfed by the animalcule when taking food, the latter as well as the infusorian itself being continuously and totally immersed. This organ is the contractile vesicle, which has been said to have no existence in plants, even in nature's lowest and humblest. If, as has been seriously stated, a contractile vesicle is observed within a living object, it follows that that object cannot be a plant. Yet each gonidial cell contains two of these minute organs, that regularly and quickly contract, disappearing entirely only to re-appear almost as speedily in the same place. With twelve thousand gonidia, each bearing two contractile vacuoles, *Volvox*, let it be what it may, is well supplied. But as *Volvox* does not swallow solid food, as the infusoria do, what function have these regularly pulsating spaces? One effect is to puzzle the observing microscopist. But as a feature by which to decide the animality of the revolving, ciliated globe, they are worthless, for the undoubted zoospores of not a few microscopic plants not only possess cilia, but pulsating vesicles that contract as rapidly and as regularly as do those of *Volvox*. The statement that no plant can have a pulsating vacuole may be safely rejected.

But the gonidia contain still another organ no less puzzling than those already mentioned. This is the red, "eye-like pigment spot." Similar collections of colored pigment are common in the infusoria and the rotifera, in the last-mentioned animals sometimes being placed in contact with a distinct lens, which may give the owner at least a glimmering of light, and so enable it to advance toward the source. But what function, if any, a similar pigmentary spot without a lens can have a *Volvox*, is an unanswered question. With motion, cilia, contractile vacuoles and twelve thousand "eye-spots," characteristics of common, microscopic animals, *Volvox* becomes an interesting object for serious study.

Reproduction takes place in two ways, each of which is complex and cannot be described in a popular paper like this. But as the result of one method, the original sphere may contain within it from eight to ten young spheres, much smaller, but somewhat similar to the parent, as shown in the accompanying photograph, where ten are pictured in a single maternal *Volvox*. These finally escape through the ruptured surface of the original sphere, the parent giving her life for that of the young.

In the photograph the small rings which stud the surface are the green, gonidial bodies. The cilia attached to each one are not shown. To photograph them with *Volvox* living and actively moving, would be almost impossible; to do so after it had been prepared as a permanent "mount," for preservation in a cabinet of microscopical "slides," would be almost as difficult, since soon after death they become flaccid, indistinct and difficult to be detected, even by the eye aided by a good microscope-objective.

But is *Volvox* a plant or an animal? Eminent microscopical botanists have unanimously decided in favor of the plant. But who knows what it really is?

ANNOUNCEMENT.

Beginning with the May issue, Miss M. A. Booth, of Springfield, Massachusetts, will take charge of a department of "Practical Microscopy." Miss Booth was for many years an editor of "The Observer" magazine, and is well known to all who use the microscope for serious scientific work or for pleasure.

LITERARY AND BIOGRAPHICAL

THE TWIN PERIODICALS.

They were not born twins, but soon became so, or at least the younger is trying with all possible speed to catch up with the elder, and to be so like it that one "can't tell t'other from which." And, to its discredit, it is succeeding fairly well in that ambition. First came "Country Life in America," anxiously awaited from its first announcement by a host of lovers of country life. It promised well and, to be frank, it, for a time, fulfilled these promises fairly well, and in many respects is mighty good yet. It is at once a "joy and a botheration" as one might speak lovingly of a frisky child full of animal spirits. It is a pleasure to turn over the leaves of "Country Life in America" and to gaze appreciatingly, enjoyingly or longingly, according to the spirit of the moment, upon beautiful pergolas, elaborate garden walks, high-bred stallions, vigorous bulls, gorgeous automobiles, luxurious rooms and intricate tapestries. It makes the gentle reader happy to think that some one has such possessions, or that persons really exist in this world who can have them. There is a satisfaction in knowing that some of mankind can show such evidences of superabundant wealth. But the country life, alas! where is it? The reader looks through the magnificent pages that illustrate metropolitan wealth and is disappointed, because he is seeking something that shall flavor of rural life, and fails to find it. Yet "Country Life in America" is the title of the magazine.

When we were feeling decidedly depressed at such portrayal or absence of portrayal of our favorite country, a star of hope began to shine faintly but clearly in the east. "Suburban Life" at the popular price of $1.50 appeared in Boston. On the first cover page it set up its standard of an open barn door, and down the vista we saw a sleigh gliding along a country road. It was charming, and we eagerly bought the first number, and at once sent in a year's subscription. "Suburban Life;" that is it. The city on the one hand and all wild nature on the other. Beautiful for location! One can tolerate half of metropolitan life, if the other half is made up of suburban walks, country roads and wild nature. But the star moved westward, and stood over New York. And like Thoreau who, when he went to make his home with Emerson, acquired, it is claimed, his tone, his walk, and even the curvature of his nose, so this second "Life" came to be more and more nearly a twin to the first "Life," for it moved down toward Twenty-third Street, shall we say, to be closer to its beloved ideal! And it, too, advanced its subscription price to $3. It left just a distinguishing bow of ribbon, as on human twins. The number of ths second "Life" now before me has a pink cover, while that of the older "Life" is blue. That is the way I "know t'other from which." Each magazine is a delight, and both, like some other twins, are a "botheration." Yet with all the joys and delights embodied in each, both are a disappointment. They are not just to country life nor to suburban life. There is something in the country and in a suburban existence besides the artificiality here so extravagantly portrayed. The writer has been a cash subscriber to every number of both publications, and hopes to continue, and no one more thoroughly appreciates their needs, nor more greatly regrets their one-sidedness and their shortcomings. It is on account of the last mentioned conditions that "The Guide to Nature" has become a necessity. The very country, the shrubs, the tangled thickets, the leaves, the winding roads, the natural vireo and the costless daisy have long been crying out for representation. No one blames the

"parents" of the "twins." They have been lead by the pocket-book into delineating a metropolitan wealth, superabundant delightful wealth, and calling it the country and the suburbs. They boldly and confessedly are "class" magazines and in that class they are good. But they have widely diverged from the connotation of their names and in drawing away from their true sphere, as suggested by those names, they have left a space that is broad and deep. "The Guide to Nature" is coming to fill that vacancy. It will tell you truly of country life as well as of the delights of the suburbs. It will try to show you what to look for and to look at in the country, and what to take to your home in the city or in the suburbs. It will not deal entirely nor frequently in "glittering generalities," although it hopes to sparkle sometimes, and at all times to grow steadily with the fire of nature's inspiration, fanned by the breezes that swing above the fields and toss the clouds across the sun. The sight of a leaf lying on a cluster of bluets in a grassy meadow will be more welcome, and will more thoroughly merit a full page illustration, than will a thousand Fur rugs of a roomful of priceless tapestries. It will be a guide to nature, not a sign-post to point out the useless things that unlimited wealth can buy. A description and picture of an invisible object as it appears under the microscope will give "The Guide" greater satisfaction than the portraits of forty bulls of Bashan.

DOMINION OVER PHYSICAL NATURE

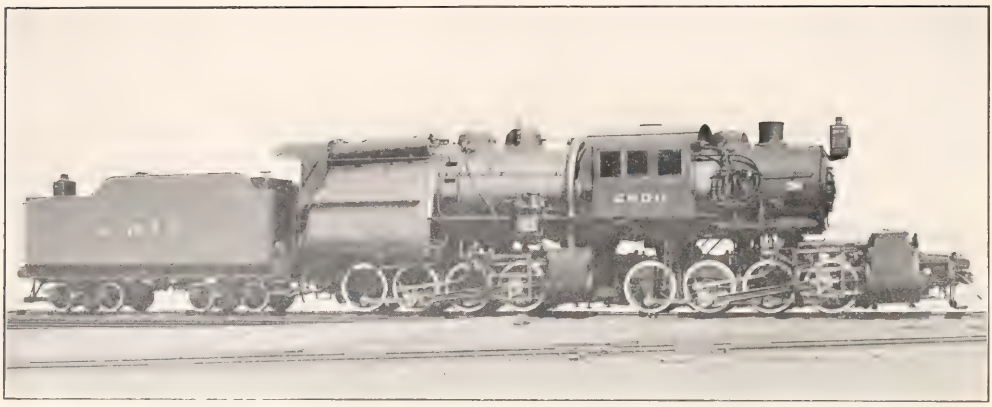
HEAVIEST LOCOMOTIVE IN THE WORLD

All records in locomotive construction have been broken by the completion at the Schenectady Works of the American Locomotive Company one of the three Mallet Articulated Compounds for the Erie Railroad. It was only three years ago that the railroad world was astounded by the enormous size of the first representative of this type in America, the articulated compound built by the same company for the Baltimore & Ohio Railroad. These Erie engines, however, surpass their predecessors as much as that engine did its contemporaries, and they stand in a class by themselves as the largest and most powerful locomotives of this or any other type in the world.

The articulated compound locomotive was first introduced in this country to solve the difficulties brought about, on roads with long and steep grades, by the rapid increase in size and power of the modern road engine. On such grades several helpers are required to handle a train which a single road engine can bring to the hill, or else the train must be "cut." This entails trouble and delay in the moving of traffic. To solve the problem it was suggested to concentrate the helping power in one combined set of engines flexibly connected under one boiler. In this way the power of each of the ordinary engines could be put in the hands of a single crew.

This method was brought into realization on the Baltimore & Ohio Railroad in the locomotive above referred to, and the decided success of this engine during the time it has been in service has brought about the increasing popularity of this type, which has reached its highest development in the engines just delivered to the Erie Railroad.

Each of these enormous locomotives is in reality two engines combined in one. The rear engines are carried in frames which are rigidly attached to the boiler; while the forward engines are carried in frames which are not rigidly attached to the boiler, and are in fact a truck which swivels around a centre pin locat-



THE LARGEST LOCOMOTIVE.

ed just ahead of the high pressure cylinders. They are designed for pusher service and will operate on the Susquehanna Hill between Susquehanna and Gulf Summit, where the ruling grade is 1.3 per cent. The total weight in working order of each of these locomotives is about 410,000 pounds. Each locomotive has sixteen driving wheels, arranged in two groups of 8 coupled wheels. The high pressure cylinders which drive on the rear group of wheels are 25 inches in diameter by 28 inches in stroke, and the low pressure cylinders are 39 inches in diameter by the same stroke. With a boiler pressure of 215 pounds and driving wheels 51 inches in diameter, these engines will develop a maximum tractive power, working compound, of 94,800 pounds and 116,000 pounds, working simple. This means that one of these locomotives will haul 210 cars.

The boiler is the largest locomotive boiler ever built, and is of the radial stayed type with conical connection. The inside diameter of the first or smallest course is 82 inches, while that of the largest course is 96 inches. The plates are, of course, all very heavy, the heaviest ring of the shell being 1 1-16 inches.

The engines are compounded on the Mellin system which has been so successfully employed on a great many two-cylinder compound engines; and their operation, therefore, is exactly the same and as simple as that of a compound locomotive with half the number of cylinders. By an ingenious arrangement of the reversing gear, the weights of the valve motions of the front and rear engines counterbalance each other. The reverse lever is operated by compressed air cylinders by means of an auxiliary lever which controls the valves in the air cylinders.

While the hauling capacity of these enormous engines is more than double that of the heaviest freight engine now in service on the road, the load on any single pair of driving wheels is less than that of many of the ordinary road engines of the present day. In view of this fact, the advantages offered by this type for the concentration of power in a single unit are readily recognized.—*Courtesy of Erie R. R.*



This department has been unavoidably omitted from this issue.

The AGASSIZ ASSOCIATION

WHAT THE AA MEANS.

The Agassiz Association stands for the study of nature from the student's point of view. It is the University and not the Kindergarten. Whether you are four or eighty-four it says, be an original investigator; see things for yourself; look into the thing, not into what has been written about the thing; what you find, not what someone tells you to find; begin with nature: in the words of the great scientist from whom we take our name, "Study nature, not books." The Association does not stand for the Kindergarten notion which says, "I will show you how to play the game; then we all will play it." It does not tell you to study this or that and to do it this month, regardless of the fact that "this" or "that" may be totally inaccessible to you.

The AA has no publishing house to advertise, no list of general nature study books to sell, no cuts to be selected from its list of publications and saying, "Study these things this month," but meaning, "Buy these books this month." The AA publishes its own magazine,—The Guide to Nature,— monthly, illustrated,— has its handbooks of instruction as an organization, the total income from the sales going to enlarge the field of its activity. It is to support no Institution. It does not delude its members into the belief that they may receive something for nothing. Its officers have no salary. They give their time and their labor, and are paid by thanks. It confers honors where it sees honors are especially due, but never with the ulterior designs of some Institution or periodical advertisement. There are no money dividends It is an Association for mutual helpfulness, in which every member every Officer, every Councilor contributes time or money, or both, to further the original study of nature. The AA believes that there can be no higher occupation for the human mind



With great regard
Yours very truly
Louis Agassiz
Nahant, August 25, 1862.

and nothing more inspiring than the contemplation of some aspect of this beautiful world.

It frankly invites you and with no secondary motive to join its ranks, to help and to be helped, to give your time and your mite of money to help yourself and to help others, and to receive gratefully the assistance that others can give you.

In this matter of mutual helpfulness in the study of nature, by all ages and in all places, the AA is the oldest, most extensive and most efficient organization in existence. Its membership means aid; its honors mean merit; its study of nature means love for nature, and its onward course is ever true to its motto, "Per naturam ad Deum." On these principles, and to this end, it cordially invites *you*, if you are not already a Member, to become one, or to form a Chapter of Members. If you are a Member, it urges you to greater activity in extending its influence. The work of the AA was never more needed than in this age of artificiality, of the nervous stress and strain of the modern struggle for existence, of the tension of high keyed life, of intense competition, of financial fluctuations and of varying prosperity and adversity. Now more than ever there is a deep meaning in the words "back to nature," or better still, "keep anchored in nature."

The organization, activity and purposes of the Agassiz Association for the study of God's Works is, in many respects, a parallel or at least reminds one of a church that studies, promotes and is benefitted by God's Word.

The AA has in its Corporators a board of directors or vestry. In its Council it has its leading and inspiring "lay" workers and teachers.. It has a membership of all ages, all degrees of bodily strength, all degrees of enthusiasm and mental ability and all conditions of wealth or its absence. Some are there to be helped; others to help. In this organization it is especially "more blessed to give than to receive." Those who are the most helpful to others, either financially or educationally, are often more benefitted than the recipients.

If you are not familiar with all our departments, but have read of only one part of the work, do not think that we are limited to that. We circle the earth, and with us take youth, old age and all conditions of life and circumstances. We are true to the character of the scientist whose name we bear. Louis Agassiz was equally at home in Switzerland, America or Brazil; equally enthusiastic with a company of children or with the world's greatest scientists. He would solcit money from the millonaire to build up a museum or to pay for an exploring tour, or with equal readiness give to a child a book as a help in some favorite department of natural history. Gifts to further the cause of the AA have been made, varying from five thousand dollars to five cents; or in service, from the thirty-three years of Ex-President Ballard who still continues as a Trustee, to a moment of time used by an expert in briefly answering some inquiry by mail; in knowledge, by more than a quarter of a century of faithful council and instruction by President David Starr Jordan to that of a boy or girl who assists another on some outing or by a comparison of collections. We number among our Corresponding Members many of the most eminent professors of the United States and other countries, and we also have many young people engaged in office or in business who pursue natural history as a recreation. Its aid to the worker is the most efficient; its honors are the freest from commercialism or institutional advertising its membership is therefore most satisfactory. Whether you have just begun to study butterflies, or have all the honors of an Edison or a Marconi, the AA will welcome you. If you can help it more than it can help you, that is the greater reason why you should become a member, for the work of the AA is in the aggregate vastly greater than that of any single worker.

ENTHUSIASM.

"The Grand Master of Enthusiasms" is the title bestowed by President David Starr Jordan on his former teacher Louis Agassiz. That is the keynote of The Agassiz Association,—it is enthusiastic in its love and study of nature.

But not particularly that the AA is *enthusiastic*,—not gushing, not frothy, but sane, sedate and earnest.

AN ILLUSTRATED MONTHLY MAGAZINE FOR ADULTS. DEVOTED TO COMMONPLACE NATURE WITH UNCOMMON INTEREST.





Vol. I MAY, 1908 No. 2

THE GUIDE TO NATURE

EDWARD F. BIGELOW, EDITOR





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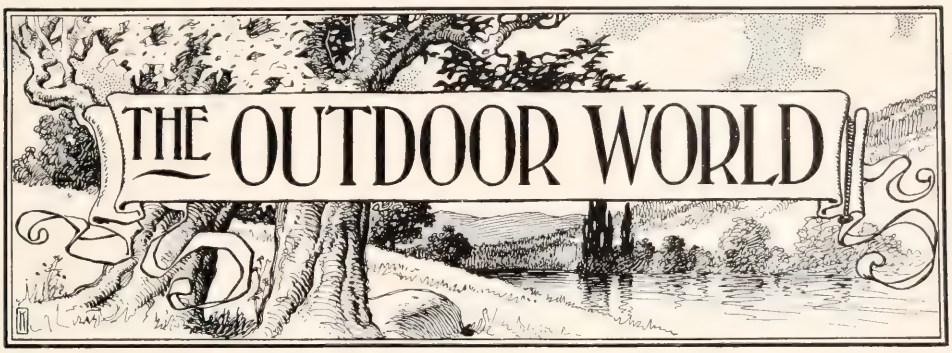
SEE ARTICLE, "GROWING MILLINERY IN THE BACK YARD," PAGE 44.

"We love things not because they are beautiful, but they are beautiful because we love them."

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I MAY, 1908 No. 2



Savages in the Jungles of Hoang Ho.

A PARODY, A PARALLEL AND A PUZZLE

By Edward F. Bigelow

Stamford, Connecticut

"A man lay upon the grass, peering at it and among it, studying it curiously and intently with a magnifying glass. His friend passed by and asked, 'What do you do there?' Said the man, 'I am traveling in a foreign land.' "—"The Century Magazine."

Author's Note.—I have applied this principle of "grass travelling" as in a foreign land to an ordinary ramble in a grove by a brook near Woodside Park only a short distance from the center of the City of Stamford, in which I live. I have treated this as a "foreign land" (as it is in sad reality to many who live near it, or perhaps have been in it) and have mentioned the commonplace trees, birds, cows, squirrels, frogs and microscopic forms of life as rare specimens. The scantily clad boys represent the "native" savages. And in all seriousness, I think they did get nearer to the heart of the charming place as "home" than do most of us.

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To our older readers I submit this as a parody,—yes, and in many respects a parallel (!) to much scientific writing that buries simplicity and real interest in a mass of words. If, from this point of view, our older readers shall see a touch of sarcasm, I shall be glad; that is, if it tends to reform. To our younger nature lovers, perhaps it will serve as an amusing puzzle to be deciphered and told in common language what are all the animals and plants referred to.—E. F. B.



EARLESSLY I pushed onward into the wilderness. It had been a long and weary tramp since I left the haunts of men. I was in a forest untamed and untouched by the hand of man, save here and there a faint sign in a broken shrub to show that some other explorer or Nature lover has been along that way. Persistently I had followed a trail now almost lost in the tangled shrubbery, now winding among huge trees, down deep ravines and across great stretches of lowlands.

How came this trail here, I wondered. I fancied that it might have been made by the constant trampling of some huge animal in his quest for water; some creature whose ancestors had been remotely related to the primitive bison.

I was near to the heart of Nature. Few from the crowded cities had dared to venture into these weird and strangely impressive shades.

Wild beasts, fierce but beautiful, peered at me from the bushes, or startled me by a leap across the trail, as I pressed onward through the jungle; brilliant birds flitted before me, or darted from limb to limb in the leafy arches above. I was prepared to meet any of these creatures. Indeed, even thus far in the journey I had had many an exciting encounter. Creatures strange in name, impressive and beautiful in appearance had gathered to increase the accumulating spoils of many a previous hunting trip. It was a journey of attack, on my part. It was a chase within the unknown, and a preparation for the unexpected. In addition to the usual weapons, I carried my trusty camera. The land was a land of wonders. On a huge Quercus alba, a fierce Sciurus hudsonicus gymnicus, chattered and bristled, and flashed lightning from his glowing eyes, till in a very explosion of wrath he had leaped into the topmost branches of the Quercus. And I said, "That's you! I know you." From a Betula flitted through the air Cyanocitta cristata with defying taunts, while from an Alnus came the terrifying rattle of a Cyrele alcyon. But not in the least daunted (though thrilled by all these) I pursued a Spelerpes into a cavern under an old log. The battle was at all its exciting height. A Rana catesbiana sounded forth its sepulchral warning. But not even this could daunt me. I said to myself, "I have but one life to live, let me live it here in conquest. Give me the battle royal." Just then a Neotoma darted from a secluded part of the jungle and I started in full chase. But here it was not for me to conquer. He who had never fought, but ran away lived to fight some Megascops another day.

At the edge of the densest jungle of all, I calmly collected trophies of this strange land, among them Chelone, Lysimachia, Xyris, and just beyond the water's brink a wonderful Utricularia. And I thought, "How strange would be all these beautiful objects to the gray heads and ignorant eyes of yonder city." Perhaps they had read of the Basilosaurus, of the Archæopteryx, the Dinosaurus, the Thespesius of ancient days, and said, "What wonderful animals in those days. How I wish I had been on earth to see them." The most wonderful things are always supposed to be distant in both time and space.

Just then, to interrupt my meditations, came a blood-curdling cry.

"Yo-ho! Yo-ho! Yo-ho! Yo-ho-o-o!"

It was answered from the distance.

"Ah lu! Ah-lu! ah lua lua loo."

'Twas enough to strike terror into the heart of any exploring pale face. My heart beat quickly. That was the only sound I could hear except the cry of some strange Canis in the distant tangle,

and the rippling of the waters in a brook before me.

Almost involuntarily and with haste, I leaped to the body of a dendron and clung to the spreading arms above. Thus secure, I looked down on four savages, young and lightly clad, who, carrying canoes above their heads, rushed out of the thicket on the opposite bank of the stream.

Judging from the outlandish language, which was mingled with their fiendish yells, as the young savages hurried from different directions to what seemed to be a point of rendezvous, I was not a little surprised to observe, that they could speak many words not wholly familiar to me, yet not entirely unknown. I retained a recollection of certain parts of some peculiar intonations, and of certain inarticulate gurglings, that I myself had often uttered in my own youthful days. Could these creatures be what are generally known as boys? They appeared to be such, and I must admit that, in spite of the horrible sounds that continued to issue from their breasts, they made a pleasing picture, as they stood in the shallow water at the opposite side of the stream. The canoes above their heads pointed upward; the tangled shrubbery formed a beautiful background, while, to me, in my perch in the dendron, the entire scene was reflected in trembling flashes, as the water rose and fell in broken ripples at their feet.

They seemed oblivious of the whole world, except of that small part containing themselves and their canoes. With a cry of raucous stridor, one dropped his boat and fell beside it on his knees. As the others clustered about him, with a repetition of his bellowing, the air to me appeared to acquire a peculiar condition, by which I was enabled to see to the bottom of the stream, and to hear delicate vibrations which were apparently non-existent to the wild creatures on the bank.

Within the water, advancing over the sand, was the most horrible monster that my eye had ever seen, although I had been using the microscope and its accessories for many years. With a



THE "SAVAGES" READY TO MIGRATE WITH THEIR BELONGINGS.

"They made a pleasing picture, as they stood in the shallow water at the opposite side of the stream. The canoes above their heads pointed upward: the tangled shrubbery formed a beautiful background."



"THE ALMOST NAKED SAVAGES."

"It was a camping party, I was sure, for behind the unfortunate little chap was a small canvass screen, that certainly concealed a sleeping place, and before which he stood and dripped."

slow, steady and relentless advance, it approached the boys. I had no eyes except for that terrible aquatic beast. A pear-shaped mass of stones, the narrow end apparently applied to the earth, it moved in a stately way, but by what means, I then failed to see, and that failure added to the horror of the situation. The pyriform mass was composed of great rocks of varied size and form, cemented together with a skill, a care and a beauty of finish, that I had rarely seen equalled by the work of any earthly stone-mason. Each piece, big or little, was fitted exactly in contact with its fellows, so that not a crevice, not the minutest space could be seen, yet there was no cement, no mortar, no external supports to hold them together. It was the perfection of skillful work with stone. But what had made it, and what was within and moving it? I forgot the young savages; I was deaf to their horrible noises; I saw only that slowly advancing, pear-shaped building of stones. As it reached a slight declivity in the bed of the stream, it tilted a little, so that I saw a round opening, from which issued a mass of long, squirming tentacles, colorless, semi-fluid, in aspect like the white of an egg, but ever extending and retreating, twisting and writhing. Could it be that these jelly-like arms were a part of an animal within that stone dwelling, and which had built it of the rocks at the bottom of the stream? It could be no otherwise. I thought that the monster was preparing to attack the youths, perhaps attracted toward a good meal by the terrible sounds that, not for a moment, ceased to issue from their gaping mouths, and I was on the point of crying a warning, when I perceived that the stone dwelling was advancing toward a matted mass of what seemed to be a green scum on the water's surface, but which another glance, in that strange atmosphere, showed me to be a cluster of thread-like plants, composed of cylindrical cells placed end to end, with transparent walls, and with several bands of the most beautiful green twisting spirally around the inner surface of each. A gyrating spiral, as truly as a spiral ever twisted about a cell-wall. I could see the contents of every thread flowing rapidly up and down the sides, and could hear the clashing of the solid particles as the internal currents dashed them together, a steady, delicate hum, mingled with the tinkling of the colliding grains. The monster, without a moment's hesitation, mounted into the mass of these lovely plants, and at once, with the tip of a colorless tentacle, pierced the cell wall, and in a slow, deliberate, relentless manner, that increased the horror of the

scene, surrounded the cell-contents with those jelly-like arms, and threw them into the mouth of the stone house, and beyond my sight.

The animal was actually feeding. I was witnessing a sight that other microscopists had yearned to see, but to happy me it had come unsought, as a part of this enchanted glen. I then recognized the terrible creature as the Difflugia, one of the Rhizopods, to be taken in every ditch, and familiar to every owner of a microscope; and in the mass of plants with the banded spirals of green, I knew the common fresh-water Alga, the Spirogyra. I was delighted, although I felt that I was in an enchanted country, and that as soon as I felt my dendron, I should awake to the realities of the ordinary world, in spite of the youthful savages yonder, that never ceased to utter those raucous yells, which, as far as I could perceive, were entirely unnecessary. I afterward learned, that boys always and almost continuously, make such noises.

But there was something wrong with one of the canoes, and in the savages' interest they, for a few moments, forgot to yell. The silence was delightfully soothing, in the rarefied state of that atmosphere, where every rustle was magnified into a roar. As the youths examined the damage, I heard the most delicate and delicious music that ever greeted mortal ear. In faintest waves and whispers of an unearthly melody, the music rose and fell, until the jungle was trembling under the dainty vibrations of a symphony from crystal bells, that pealed and tossed until they seemed to be delirious with their own melody. What was it. Where was it? If those savages would keep still for another moment, I could find the source. Indeed, I must, though I descend and throttle those wild creatures. Dainty and delicate, that music fainted into silence, and delicate and dainty it swelled again until the world seemed to be a music-hall of the fairies. I see them, I see them! In the depths of the water, silver and crystal bells are swinging and tossing at the end of their supports, as the waves flow past, and that delicious oratorio became a part of the very soul of the only human being that heard it. The bells, colorless, minute, exquisite, were attached to the filaments of various fresh-water Algae, and I recognized them, too, as old friends seen in a new locality. Many a time I had had them under my microscope, but never before had I heard their music. My dull ears had never before been sensi-



THE "SAVAGES" HAD MADE BOATS FOR THEMSELVES.

"But around the curve they dashed in a reckless way. * * * It must have been a delightful experience and sensation.

tive enough to catch their delicate pealing, but I felt that the music must be there.

They were animals, too; I knew that by my previous observation. They were familiar to me and to other microscopists as exceedingly common inhabitants of every ditch and shallow pool in the land. They were the "Collared Monads" among the fresh-water infusoria. I was still listening, rapt, when those horrible stridors broke out afresh, and the youthful savages drowned that delicate music with raucous cries. Then one became articulate.

"I say, fellows, let's lug 'em further down, under the grape vines, and get a fair start where there's plenty of water."

Boys they surely were. They could speak my language!

"It's a go; and the last one in camp is going to be the cook."

With a fiendish shriek that split the air, and made the leaves quiver, they tossed their canoes into the water, and leapt into them. With knees drawn up, and in threatening attitudes with arms and paddles, they prepared for a dash across the stream. They appeared to be boys of the human species, but I failed to understand why it was necessary to be so violent, so painfully active, and to make such grimaces. Look at them in the picture, which my camera caught unsuspected by them, and you will no longer wonder at my amazement. If they had been quadrupeds, or microscopic creatures in the mud, I should have appreciated the situation, but these appearances were mysteries. Yet they all are possibly a part of the undeveloped animal nature in such young savages. As they paddled down the stream, they unintentionally formed another beautiful picture. The light was sparkling on the waves, and touching the leaves with a golden gleam, while the spray from the paddles flashed rainbows. I made a movement to descend from my dendron, yet refrained, as I was not entirely satisfied that it would be safe. I had had sad experiences with animals before this, and had suffered from too much confidence. I would wait. And I did not care to disarrange the scene.

Suddenly a cry of pain came from the upper stream, and suggestive gurgling and bubbling preceded a silence that brought the paddles to a quick rest, with many gutteral noises, and a swirl of water.

"I believe that gone gump has run on a rock, and tumbled over-board again, as usual. Quick, fellows! get back, and help him out!"

I will not repeat their words as they turned their canoes and paddled toward the starting point, and neither will I mention those used at the destination. I do not find them in my dictionary. I doubt if they are known among civilized adults of the human species.

"Now," I heard, as the unhappy fellow was seized by the seat of his trousers with a shake, and slapped down on the bank, "Now, stay there, and dry off, and serve you right! How many times have we pulled you out this trip? Get in again, and you stay in. Mind that."

It was a camping party, I was now sure, for behind the unfortunate little chap, was a small canvas screen, that certainly concealed a sleeping place, and before which he stood and dripped and where, while he was not entirely happy, he was not absolutely disconsolate. I imagined that canoeing was not "all cakes and ale" to his young nerves and sinews, but that there was perhaps a sting somewhere in the boat.

There will be no rapids for you today, Jimmie; and see that you cook a good supper by the time we get back. Say, do you hear? Say, Jimmie, pony up now! Say, s-a-a-a-y, J-i-m! Overboard three times in three days. O-o-o-h, Jim! Ya, ya, hi, hi, hoch, hoouch, hi, Jim!"

Savages without doubt, and "rubbing it into" poor Jimmie. None but savages would thus treat a companion. I felt that they might be cannibals, too, and would eat poor Jimmie if the meal that he must prepare were not satisfactory.

They were off like a flash, while I peered from my leafy dendron, and rather hoped that Jimmie would not be the only one overboard when the rapids appeared. But around the curve they

dashed in a reckless way, past Julian Island, past Rockland Cove, to Turtle Point.

It must have been a delightful experience and sensation. The voyagers were momentarily silent. They had something more to think of just then, and more important, perhaps, than the blood-curdling howls which they were capable of producing. It was a relief, as I could still faintly hear a gentle swelling music from the crystal bells, as the water broke over them and the canoes floated above them, setting them into a mad peeling as they tossed in the foam.

I was now convinced that these padding creatures were boys, and that I had little to fear from a closer approach, perhaps an actual contact. My muscles, too, were becoming cramped by my long stay in the dendron, as I am not so young as I once was.

The boys had returned to Jimmie at the camp. I descended and approached them, with some caution, yet with much confidence, too, for a boy is a loveable animal after you have smoothed him down in the correct way.

Perhaps my touch was not sufficiently delicate. To Jimmie, who was still gently dripping in spots, while the others grinned and emitted rhythmical yells and screeches, I said:

"What are you having here?"

"Fun!"

"What do you live on, if I may ask?"

"Vittles!" was the complete and explicit explanation.

"What do you see here? I know that my presumption is great, but what do you see here?"

"Things!"

I shouldered my camera and my implements of warfare, and without another word, retreated from the jungles of the Hoang Ho, wishing that there could be more boys to form such camping parties, and thinking well of them, notwithstanding their impetuosity and excess of animal spirits.



ORCHIS SPECTABILIS.

Transplanted from the woods to the back yard.

ORCHIDS AND CYPRIPEDIUM.

BY PROF. WM. WHITMAN BAILEY, BROWN UNIVERSITY, PROVIDENCE, R. I.

When visiting a conservatory of choice exotics, we are usually most attracted by the singular and beautiful orchids. It is a rather curious fact that while genus "Orchis" gives its name to the vast and noble Orchis family, it contains, in our flora, but two species, and these by no means so common as examples of other genera.

The one of these illustrated in our figure is *Orchis spectablis,* the showy orchis so-called, though as a matter of fact, not nearly so handsome as certain "Habenarias." While not a rare plant, we

have found it shy and local. Thus, it skips Rhode Island altogether. It has, however, a wide distribution, from New Brunswick to Georgia, west to Minnesota and Missouri.

It is found in rich woods, and is one of those plants which from its lovely associations, ever recalls to the mind of the wood-lover, scenes of rare beauty. Thus the writer, when he occasionally sees it, thinks at once of his early home at West Point in the Hudson Highlands. There it may be found, unless "improvements" have eliminated it, growing in the dark ravines of Crow's Nest or about Redoubt Hill. Its associates in this haunt of the Culprit Fay, are the yellow violet, wild ginger, climbing fumitory, yellow lady's slipper, and starry campion. It will be noted that these friends of its choice, with others too numerous to mention, are all beautiful and equally retiring. Finding orchis we may safely look for them, though their presence does not necessarily denote the vicinage of orchis. Such ecological relations are among the most fascinating subjects of modern botany. Once considered merely curious, they are now recognized as of profound significance. There seems almost a human quality—something pathetic—in these long-continued friendships of plants. How did they start? Why do they endure? Are they eternal?

Showy orchis is a small plant, with its scape or flower stalk some four to seven inches only in height. It rises from a root of thick and fleshy fibres, crowned by one or two smooth and glossy oblong-ovate, radical leaves. In texture the bracts resemble these, but are lanceolate in shape, subtending the individual flowers of the erect raceme.

As would naturally be expected from the type or "name-flower" of the family, Orchis exhibits in a fine way, the distinctive characteristic of the noble order. The flowers, usually pink or purple, and with a faint, ineffable perfume, are ringent or grinning, of three sepals and three petals, the latter being of nearly equal size. These lightly join to form the hollowed "helmet" or upper lip. The apparent lower lip is undivided, and turned downwards. This characteristic part of all orchids is really an upper segment of the perianth, which by a half twist of the ovary is more commonly brought to the bottom of the flower. There it forms a lodgment or platform for visiting insects. In our special case it embraces the base of the "column," a term employed in orchid description to denote the union into one body, of the stamen (or, in Cypripedium," two stamens) with the pistil. The anther-cells of these are contiguous,—i. e., touching, —and parallel, producing pollen in coarse waxy grains, agglutinated into pear-shaped masses by cobwebby threads. Each pollen-mass, (pollinium) extends



CYPRIPEDIUM ACAULE.
Transplanted from the woods and grown in the back yard

below into a stalk—bent near the base at right angles, and terminating in flat, circular, adhesive disks. These, when removed, as shown by Darwin, through hygrometric effects of the atmosphere, change from an erect to a nearly horizontal position. As originally standing, when removed by a visitor, they could not, when the insect approached another flower of the species, in any way, reach its stigma. The change of direction, however, accomplishes the desired end.

Here must be borne in mind, that of all created plants, orchis appear best adapted to the process of cross-pollination, so necessary to their continued existence as a race. Their extraordinary colors, their fantastic and not infrequently grotesque forms, their simulation of insects and even birds, and their often powerful odors, have reference to the structure and needs of their visitors.

The reader can derive an excellent idea of these wondrous doings from Darwin's "Fertilization of Orchids," from Gray's "Text-book of Botany," and "How Plants Behave," and from that rich mine of botanical information, Kerner's "Natural History of Plants," translated by Prof. Oliver. In all these, the beauty and clearness of style, and the admirable pictures make straight the way for any reader.

When we turn from the genus "Orchis" to "Cypripedium" we note at once, material difference of structure. The most important of these is the change in number of the stamens from one to two. But a more evident featural peculiarity is the hollowing out of the lip into some ornate, often exquisite form of bucket. It is perfectly marvellous how this bucket is played upon and modified by nature as one views the host of cypripedia that the tropics supply. We will note even in the small number of our North American species, how it varies. Thus, in stemless lady's slipper, *Cypripedium acaula,* it has a deep slit or gash in front, while in the three others here figured, it is a bag with more or less wide mouth. It is this bucket or sac to which the name "slipper" has been popularly applied. Indeed, the botanical name also refers to a shoe or sandal, the "Slipper of Venus." Our American ones are often generically called "moccason flower," a more significant name so far as their shape is concerned.

Of these, *Cypripedium spectabile* is the most beautiful. It may be called common in our extreme Northern States, from Maine, across the country to Minnesota. It is splendid enough for any garden, and indeed, is cultivated to an increasing extent, where it is at all possible to imitate its natural, but not imperative requirement, a peat bog. Its large pouch or slipper is one and a half inches long, snowy white in the body, but in front superbly painted with pink-purple. A group of these noble plants—or a wood full, as one sometimes sees—is a sight for gods and men,—a temptation to any American Persephone.

The stemless lady's slipper, is, undoubtedly, the most familiar of any. It is especially fond of sandy districts, such as Epigaea also likes, and in such places as in parts of Rhode Island, it is abundant. Averaging about a foot in height, it is downy and two-leaved at the base of the scape. In rare cases the writer has seen two flowers to the scape. Usually there is but one; this, except in the high north, (Maine, New Brunswick, etc.) generally rose-purple. The Manual says "rarely white." In New Brunswick we would note "rarely purple," generally white. This albinism is apt to develop in plants as they approach boreal or alpine situations. The big bract, overarching the flower, as seen in our picture, is green, while the sepals are of a peculiar livid, or brownish-green color. The slipper is marked by its intricate veins of a deeper shade of its body color. The big, plaited, parallel-veined leaves are conspicuous at any season. This plant also readily bears transplanting.

The Lady's Slipper.

Perhaps Titania, wandering by the way,
Espied this slipper in her path one day;
A yellow sandal, striped with bands of red,
And stitched with many a mystic golden thread.

She doffed the satin wonder of a shoe—
Beyond the beauties that we mortals knew,
And left it here by elfin wishes blessed,—
A peerless sandal that a queen had pressed.

Or is this slipper gleaming in the grass,
Fair Cinderella's tiny shoe of glass?
May be the Prince, who never can forget
His lovely partner, seeks its fellow yet.

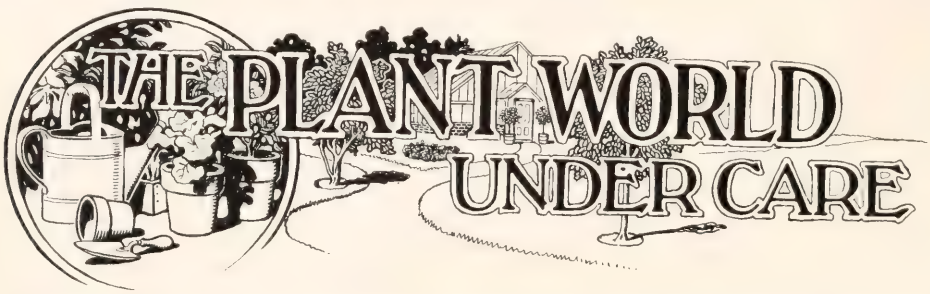
Or did some Indian princess, in the chase,
Leave here a relic of her dusky race?
A beaded buskin, set with gems and gold—
A prize indeed, for any chieftain bold.

I think no mortal can attain the gift,
This wondrous treasure from the ground to lift;
The tale may yet be told by fairy pen—
Or poet gifted o'er his fellow men.

The two species of yellow lady's slipper are more choice and rarer than the purple. They are so closely similar except in the same size of flower, that some suppose them to be but variations of the same plant. They are found in low woods or in bogs, where to approach them one may have to wade through dark water and black mud, up to his knees. They do not actually grow in water, but often have these uncanny surroundings. This, in one way,, is fortunate, as it tends to preserve two of our loveliest plants.

The smaller one, *Cypripedium parviflorum,* grows a foot or two in height, and has oval, acute leaves, alternately disposed on the stem. The lip or slipper is over an inch in length, almost glossy yellow, and, instead of being slit in front, is a well-closed bag. The sepals are ovate,—or approaching lanceolate. The flowers are fragrant.

Cypripedium pubescens is a pale yellow, grows fully two feet in height, and is soft-hairy, where the other species are smoother. The sepals and petals, too, have less of a brown purple color, and the lip is laterally flattened. Both species have about the same range, that is from Newfoundland to Georgia and west to Minnesota and Kansas.. Both of these are supremely beautiful plants, and he who finds them on some red-letter day, is well aware that he has secured a treasure. Like *Cypripedium acaule,* the stemless or purple species, they are easily cultivated.



The garden, floriculture, domestic plants, suggestions for "the grounds beautiful," inexpensive greenhouses, gardens for young folks, hobby houses in the back yard, etc.

GROWING MILLINERY IN THE BACK YARD.

It was a sunny forenoon in the latter part of May. I was weeding the flower bed by the fence next to the road.

I stopped and looked up as I heard the voice of an Aged Resident say cheerily, "I thought you were a naturalist, but I see you have turned horticulturist. What's the matter? Isn't there as much money in the bug business as there used to be?"

"Wrong you are, again," I said. "I haven't turned horticulturist; I've become a milliner."

"Milliner!" he shouted in astonishment. "You are a queer one. I've sometimes thought a naturalist is a little 'off,' but I shall think so more than ever if you don't explain what in the name of thunder that bed of plants has got to do with women's hats."

He leaned against the fence in a way that showed he was determined to get an explanation if it took all the forenoon. "Perhaps you have not thought how persistently the milliner pushes herself into the domain of the naturalist. I went to California, and at Pasadena, in a 'poultry' yard of huge domesticated birds, was the milliner pulling out ostrich plumes, decorating show cases with them and shipping them away by the hundred."

"Don't mean to say, do you," interpolated the Aged Resident, "that there is a plant which is an imitation of the ostrich plume? I've heard tell of ostrich plumed ferns and oyster plants and a lot of others that imitate animal forms, but I never heard of ostrich plume plants."

"Be patient and I will tell you all," I replied. "This is no imitation; this is the real original thing."

"You see I went to Florida, and there were the milliners with a lot of assistants with guns almost completely anni-



A BOUQUET OF EVERLASTINGS.

hilating the beautiful white herons. We who are naturalists tried to stop it, and our warden was shot."

"Milliners shoot him?"

"I didn't say so; you suggested that," I replied. "Can't hang milliners on such circumstantial evidence. But the milliners must have something new; the white herons for egrettes were either all gone or the others so guarded as not to be obtainable in the quantities desired. So I went to a biological laboratory, and there all along the shore in company with the biologists were the milliners collecting marine animals for—"

"What, what, what!" again interrupted the A. R. "Now you're not in earnest; you can't stuff me that milliners were after fish market stuff for hats."

That's exactly it," I replied. "You describe it nicely; it even smells fish market when first unpacked from the boxes and before it is aired on the hats. The scientific people call the animals Sertularian hydroids, and say there were hundreds of them in a colony. The milliners call the material Parisian moss, and it has been having 'a run.' You see the milliners so hasten from place to place, that I want to get them into the garden, or where the greater the demand the greater may be the cultivated supply, like the ostrich plumes, but not like egrettes and Parisian moss. So I'm going to grow millinery. Perhaps I shall set a new fashion and the milliners will make raids on gardens for millinery supplies."

"Say, now, what are you drivin' at? You seem to be 'off' worse than usual this morning. Are you jokin' or only foolin'?"

"Perhaps both; perhaps neither. I am raising a 'full line' of all the plants with everlasting flowers that I can find in any seedsman's catalogue."

"Oh, I see," said the A. R. as he hobbled away, "bachelor's buttons and them things. Used to raise them when I was a boy."

No, not so much the bachelor's buttons as "them things."

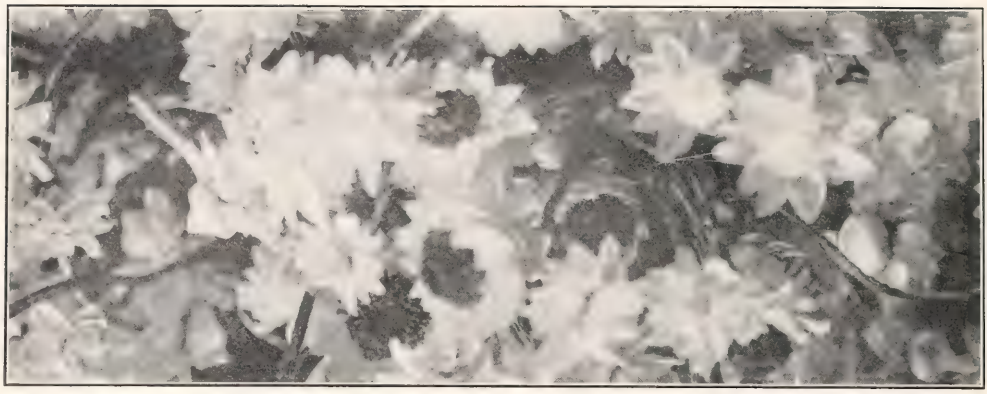
The miscellaneous "things" not so well and commonly known proved to be the best part of the experimental bed.

It was indeed interesting to observe the unfolding "rosettes of confetti" as a visitor not inaptly described the slowly spreading, beautifully tinted, papery petals. It was astonishing to see that the petals of any flower could be so dry, papery, glossy and iridescent.

To go into details of ways and means, let me explain that the plants were as follows: I give scientific names because some of them have no other kind, except



ONE OF THE "PAPER FLOWERS" ENLARGED.



A MASS OF BEAUTIFUL EVERLASTING BLOOM.

such an indiscriminating one as everlasting or straw flower or live-forever, or something like that.

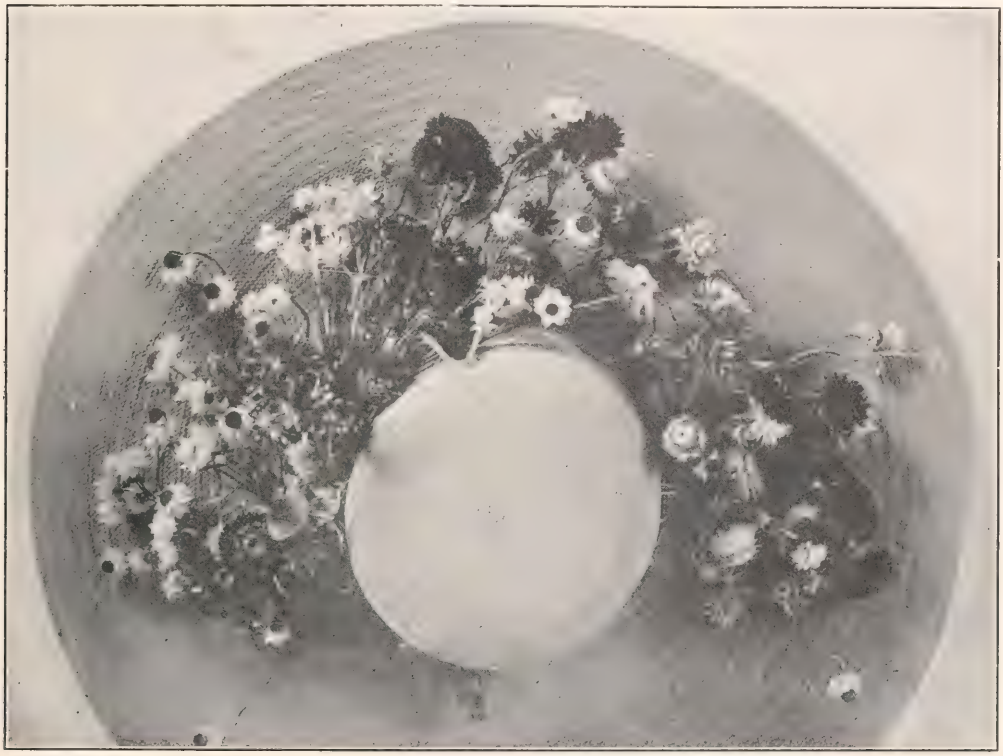
Canantanche alba and *C. cerulea*, also *Ammobium alatum*. I started in boxes within doors about last week in March. The others, sown in the bed about the first week in May, were: *Xeranthemum annum*, also *X. superbissum, X. album, X. multiflorum Acrodinum, Helichrysum, Elechrysum, Gomphrena*, and others listed in some catalogues as everlastings and straw flowers. In no one catalogue did I find many kinds, but I took all the catalogues and so got a variety. Even with some species listed under different names, I found differences enough to make it worth while to get from various dealers.

The plants grew readily and became



THIS COLLECTION WAS IN RICH VARIEGATED COLORS.

strong and thrifty. The Ammobium that produced small white flowers was especially of botanical interest in that the leaves, small and lanceolate, extended down the stem in the form of leaf-like wings. It plainly showed the close connection of stem and leaf,—a modification for different class of plant work to be done. The coloring of some of the brighter kinds was marvellously exquisite, changing in different lights and suggesting changeable silk.



A HAT TRIMMED WITH "BACK YARD MILLINERY."

As the flowers unfolded, they were cut with seven or eight inches of stem and pinned upside down on the edges of shelves or on sticks especially placed in "racks" for the purpose. With some kinds it was necessary to learn by experience just the right time to cut them. If too early, they shrivelled up; if too late, they "went to seed," the heads falling to pieces and floating away as do tufts of milkweed or dandelion.

When thoroughly dry, the flowers were packed in boxes, for convenience in handling and preserving.

During their cultivation in the garden, they had attracted the attention, not only of my friend, the Aged Resident, but of numerous passing strangers, who stopped to admire and remained to question. When summer fled and winter had possession of the garden, the gardener's friends smiled at the sight of his boxes of straw flowers, and, with a heart made joyful by the sight of the beautifully variegated petals, murmured inarticulate words about the "conservatory" and the "greenhouse," and as they passed on, after another admiring look, gently declined to listen to him when he said "out of doors," or "my own back yard," or "just along the front fence." But the reader knows and believes.

The stem and leaves of some, especially of the Amobium, remained green and continued to grow even in midwinter. I commend these beautiful, papery everlastings not only for permanent bouquets whose beautiful colors will brighten the home during the entire winter, but as an ornament for the buttonhole,



EVERLASTINGS PINNED HEADS DOWNWARD.

or to add beauty to a dainty waist, to express an unfading friendship or, if you please, a regard that shall be deeper and more permanent than mere friendship.

If it is my good fortune to be, like Curie or Marconi in their specialties, a pioneer in the domain of everlasting millinery, I will try to bear the honors meekly. If I am to go down to oblivion amid the laughter of the ladies, I will thank them, before I vanish with my splendid flowers, for their kindness in listening to me as I have tried to entertain them during a leisure moment, and have tried, too, to suggest a floral display for an unoccupied corner of the garden. A garden bed of straw flowers may contain possibilities and suggestions not to be even dreamed of with less novel growths. Everlasting bonnet fixings! Unfading! Only one payment needed! Think of the economy! Married men, flee to the garden and plant the seeds of straw flowers. And when you hear murmurs that connote a new bonnet, lead her gently but firmly to the back door, and with the proper gesture, say, "There you are, my dear."

THE PLANT THAT SITS ON A ROCK.

While weeding in the corner of my cold frame I was about to pull up what I at a first glance supposed to be only a strange looking weed, but upon second thought decided not to disturb it. Then I carefully removed all the commonplace plants and studied the interloper. What kind of a plant you are, I don't know; but I am sure you are not a weed—not "a plant that grows where it is not wanted," for this glass-covered bed is for experiments with new things, and you are a thing new to me. I purpose therefore to add you to the list of my experimentings. So the plant, then only about an inch in height, was not only allowed to grow but encouraged.

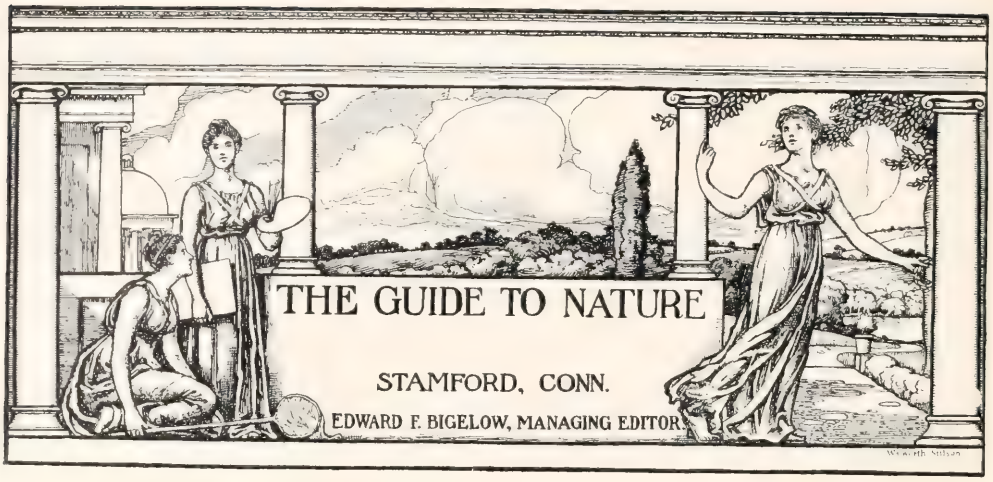
About two weeks later I was again weeding the frame and by chance, bad luck as I at first supposed, but really by good fortune as it turned out, broke one of the straggling branches then about five inches long. This I placed on the examining table in my laboratory. Other matters claimed my attention and I was absent from home for more than a week. Imagine my surprise upon going into my experiment room to see the branch as green and succulent as when I picked it, and actually developing new branches and tiny "cabbage head" buds. I went to the cold frame and examined the original plant. There in the earth it seemed to be doing no better than the branch on the table. But the examination brought to mind the name. I recalled that the previous year in another part of the garden I had planted some "live-forever," bought from a florist at the suggestion

of a botanical friend. That portion of the garden was soon after dug up by an intruding skunk in search of grub worms. And although my garden is in a thickly settled part of the city, not far from its centre, that citified yet uncivilized, entomological skunk persisted in his midnight maraudings in spite of traps skilfully and craftily set. But he had one merit. He was industrious. He dug and he dug, and he dug,—till evidently there were no worms left to pay for further work. Then I dug. I dug up the entire section, using some of the earth to fill a lower corner of the cold frame. That was the last of the "live-forever" until I saw it almost a year afterwards growing serenely among the weeds in my cold frame.

But can it be possible, I thought, that this plant is a second generation of that supplied last year by the florist. I had supposed, because it came from the florist, that it was a dainty and delicate thing. I hastened to the botany and found the book claiming that this particular species is not hardy at the north, though mighty hard to kill. In that particular respect, basing what I know of the plant on circumstantial evidence, I was inclined to render a verdict that the botany is wrong. But upon second thought I decided that I had no evidence against the botany, as I had shovelled in that earth before cold weather arrived, and, thanks to the skunk, and to chance, I had put the plant under the protection of glass for the winter. I returned to the botany, and gained better admiration for its accuracy. *Sedum,* from Latin *sedeo;* that is, it "sits on rocks, walls, etc." Yes, and upon dry laboratory tables, too, and thrives as luxuriantly as in the ground. I haven't the slightest doubt that it would "sit" with equal serenity and happiness upon a rock. Later on, when the rosy-purple buds were bursting from the broad cymes, I cut two pieces from the luxuriant plant in the cold frame and pinned them on the laboratory wall and there they budded and bloomed in a beauty that was peculiarly attractive, and an interest that was intense. I can fully sympathize with Mr. Siebold (who he was I do not know) for experimenting with the plant so extensively as to get his name attached to it, for I am indebted to him and to Japan for producing such a beautiful novelty as *Sedum Sieboldii,* the live-forever.



THE SEDUM SIEBOLDII, "GROWING" AND BLOOMING, THOUGH CUT AND PINNED TO A WALL.



THE SPIRIT OF "THE GUIDE TO NATURE."

It is the mission of "The Guide to Nature" to draw the reader toward an appreciation of the beauty and value of natural objects and away from artificial objects to the domain of wild nature; to arouse the listless student to activity and zeal in the study of nature.

Even to the most enthusiastic of us who study and love nature, there comes times when after we have "wandered away and away with Nature" we can sympathize with what Longfellow said of Agassiz, that

. . . "the way seemed long,
Or his heart began to fail."

It is at such times that "The Guide" will inspire to greater efforts and encourage every student by telling of the faithfulness, zeal and success of others. We all need good cheer from fellow workers. Much of our inspiration is, "Omne vivum ex vivo," which freely translated means, "We are inspired and cheered by a friend." "The Guide" will be a leading, enticing, cheering, encouraging friend to students and lovers of nature.

"GLITTERING GENERALITIES."

The most difficult task that has thus far come to me in the establishing of "The Guide to Nature" has been the returning of manuscripts, as I have had to do even to some of the magazine's best friends. The announcement that this is to be a magazine of helpfulness, to inspire and increase an interest in nature, has brought forth an immense number of essays on what, for lack of a better term, I must call "glittering generalities" about the beauty and suggestiveness of nature. This is to be a magazine, not of preaching on "The Beauty and Interest to be Observed in Insects," "The Fascinations of Ornithology," "Wonders of the Plant World," or similar general essays; but each article is to have a specific statement of what has been actually seen or done, not what the author's point of view may be nor what he has read.

Long ago I learned that to show one real interest is worth more than many lengthy arguments about abstract interests of that subject. It is not necessary to tell nor argue that this thing is attractive, but point out the winning features and let the persons for whom you write decide whether it is interesting or not. No jury cares for opinions. It wants proofs. Submit the "Exhibits" and let the jury of our readers decide.

And do not try to tell too much in one story. Tell it as brightly and briefly as possible and stop.

THE USUAL AND UNUSUAL.

Constantly to crave some new thing seems to be a natural quality of the human mind. But it is not the new things that are really the most important nor the most alluring, when the cultivated man begins to think and to investigate. The commonest objects upon which the undeveloped or uneducated person sets his foot in ignorance and in careless

indifference are more frequently than not of the greatest value as a mental stimulus or even as a physical recreation. No amount of investigation can exhaust the simplest or least complicated natural object. The more apparently exhaustive the study, the more there remains to be discovered. No human being ever will entirely understand any object in nature. That remains with Omniscient Providence. All that feeble man can do is to look for only infinitesimal distance beneath the surface and to pass by near the edges of things. The well known are the most important, but we are all so calloused to them that we rarely see them, although they are teeming with unknown facts and with lessons whose importance cannot be overestimated. Why do we not all live in a state of ecstacy regarding the common objects about us? Because, as I suppose, it would take some mental effort, and that is what the ordinary person tries to avoid. It is more pleasing, it sets the circulation into greater activity to have a new thing brought suddenly to one's attention.

"If a flower
Were thrown you out of heaven at intervals,
You'd soon attain to a trick of looking up."

says Mrs. Browning. And that contains the secret of much of our indifference to the common things in nature. An educated man is company to himself because every wayside weed, every bit of cloud, every puff of wind may set his mind into a new channel and suggest thoughts that may cheer his otherwise lonely way. "To me my mind a kingdom is."

Recently a new light appeared in the evening sky. It was probably a modified aurora borealis, or other form of electrical display, but being unusual, it at once attracted attention. The sun is a daily companion and we seldom think of him, unless he is eclipsed, but a new flashing of electricity in the evening sky was followed by telegrams, telephone messages, letters, personal questions in the street. What the light actually was no human being knows or can know. No one really knows the cause of the aurora borealis, although we talk of electrons, orgon and other things of which we are crassly ignorant, but to which we have given names. That half circle of light exhibition was wonderful, and beautiful, and being out of the ordinary it attracted much attention. But doesn't it remain strange that in a world so crowded with wonder and allurement it needs the unusual to wake us to a realization of even our own existence? If that light had continued, it would soon have ceased to attract even a passing notice. But would it have become any the less wonderful? Yes, it would, to the ordinary mortal. Like the ordinary moon and the commonplace stars, it would soon cease to exist except for the special few. What a pity it is that we all become so hardened to the beauty and the teaching of common things! Can we not "call a halt," and "turn over a new leaf?" It is possible to do both at the same time.

NOT MORE MATERIAL BUT MORE ASSIMILATING.

When the naturalists' controversy between President Roosevelt and my fellow townsman, the Reverend William J. Long, was at its height, a neighbor, the principal of one of our graded schools, met me one morning and inquired, "How many are there of you fellows, any way?"

"What 'fellows'?"

"Naturalists."

"Far fewer than there should be," I replied. "A prominent naturalist has said that the Almighty has about one to appreciate His works to about ten thousand who do not."

"Well," says my teacher friend, "I am surprised to know that there are as many as that. And," he continued, "in all my reading I have known not more than half a dozen prominent naturalists in the whole country. And as half of those (Roosevelt, Long, Burroughs) have been fighting among themselves for a year or two, I've come to the conclusion that you fellows are a mighty quarrelsome lot, and I guess I'll keep away from all of you."

Replying in the same jocose spirit, and

yet partly in earnest, I said, "You are not to blame for not knowing, for the simple fact that you don't do the going. A man who never goes to church nor reads a religious paper might get the notion that God's Word is at a low ebb. We see things out of our own eyes!"

"If you are going to preach a nature sermon to me—that I ought to be interested in bugs and things, I think I will be going," he laughingly remarked. "Good morning!"

* * * *

Yes, I want to "preach a sermon" along the line of that conversation, with the subject, "The Fewness of Naturalists," which is another term for lovers of God's Works."

On the desk before me as I write lies a book entitled "American Men of Science." It contains a little more than four thousand names of those "who have carried on research work in the natural and exact sciences." These are men of ability, who for the most part have richly endowed institutions of learning with all the instruments of modern science. These men form a large company of workers. They have been aided by the liberal gifts of philanthropists. They have vied with one another in the publication of detailed and learned monographs, until the literature of any one subject, or even a small part of a subject, has become formidable to the uninitiated, and burdensome even to the esoteric few.

They form an army of respectable size, and they are doing commendable work. We are all proud to claim that this is the age of science, and we congratulate ourselves on the great advances made in the last quarter of a century. Now, in face of this great efficiency, this commendable work, this wonderful progress, these gigantic delvings into natural science, what did my friend, the principal, mean when he said that he knew of only a half a dozen naturalists? He unconsciously voiced in his jocose manner a great present need; namely, the lack of assimilation in an age of wonderful accumulation. He was unconsciously confessing his ignorance of a subject in which his remarks showed that he felt no interest.

To enter the closely related field of God's Word, what a deplorable, one-sided state of affairs it would be if we had about five thousand students of technical theology, or of the "higher criticism," shut up in monastic institutions and vying with one another in piling up pamphlets to discuss the number of angels that can dance on the point of a needle, or in producing elaborate tomes to argue about the difference between homoousian and homoiousian, with only a few scattered evangelists and Christian preachers to make the world better through the teaching and the influence of God's Word. In the Middle Ages theology was piled so high that it finally toppled over; now we have the world growing better through the application of Christian ethics, which is the basic principle of what is, or should be, the true theology.

I do not mean for a moment to claim that the present technical minutiæ of science are comparable with the verbal hair-splitting foolishness of theology in the past. Nor would I claim that our present technical science is miserly and hoarding. All honor to pure science and to its investigators. But I do claim that the natural science of the present is accumulating too much and too rapidly in proportion to dissemination. I would not hold back science, I would advance popularization.

The bulk of scientific knowledge is now enormous, and much of it is not only buried within ponderous tomes written in technical language, understood only by those specially trained to read it, but even the locality in which these volumes are stored is a secret so far as the amateur, or the ordinary but intelligent reader is concerned. Even the strictly scientific investigator is beginning to complain. The late Professor Joseph Leidy, one of this country's most illustrious observers and biologists, said that he published the results of his study in the Proceedings of only one scientific society, because he wanted to spare future readers and investigators all the time, labor and annoyance that might be in his power to save them. He said, in effect, that the results of other men's work were so extensive and so scattered that to find the records, or even trying to find them, was painfully exhausting not only to the body but to the mind and

the nerves. To help the scientific man to thread his way through this scientific wilderness, "Zoological Records" are published at intervals, but as these volumes themselves now fill long stretches of shelf room, to find one's path through them is beginning to demand some skill. Soon we shall need an Index to the Index. We want at this beginning of the Twentieth Century not fewer to accumulate or to originate; but more to disseminate, utilize and make available to the non-technical reader who may feel an interest in such matters, but who is compelled to remain with his mental longing unsatisfied because, while he knows that what he desires is in existence, he does not know where nor how to find it. We are not willing to part with Luther Burbank, nor with any that may resemble or even try to imitate him, but we do want more lovers of the garden, the flowerpot and the window-box. We do not want less of "The Journal of Morphology" but more articles on life forms in our popular magazines; we want not less of the laboratory but more descriptions of walks in field and forests and how best to profit by such excursions; we want "The Botanical Gazette, but want still more "The American Botanist;" we want not less of the American Association for the Advancement of Science, but more of The Agassiz Association; we want the Misses Foote and Strobel who with elaborate appliances have for about fifteen years been studying the anatomy and histology of the earthworm, but we want more numerous Harlan H. Ballard's, who for a quarter of a centure has been laboring to get young and old to observe the forms of life around them; we want no fewer men like Professor Castle of Harvard, who has issued by the aid of the Carnegie Institution learned monographs on "Heredity of Coat Characters in Guinea-pigs and Rabbits," but we do most earnestly desire more men like Professor Ellard of Columbia University, who is the leading spirit in popularizing a knowledge of "guinea-pigs" (more correctly called cavies) and of rabbits. Professor Castle, liberally aided by the Carnegie Institution, will reach and do good to a few technical scientists who will mark, learn and inwardly digest the elaborate tables, the x, y, z formulæ, issued on heavy paper with uncut edges, the handsome cover with the seal of the Carnegie Institution of Washington stamped on it.

But while all this is commendably doing good in its way, Professor Ellard and his associates, Professor Southwick and Mr. Whittaker, go down into their own scantily laden pockets and take a few dollars from them, and many hours out of busy lives that must labor only to live, and they become prime movers in the American Fur Fanciers' Association; they have exhibits at the shows; they write popular articles, and, by means of their cavies and their rabbits, they influence the lives of thousands of persons. Tell me, if you can, why it is that the world still gives its greatest praise to the publication of a list of Choctaw names that costs thousands of dollars, to a book of trigonometrical symbols representing the relation of thickness to length of certain hairs, publications necessarily limited to the smallest conceivable constituency, while it will at the same time regard as a sort of harmless, enthusiastic lunatic or deluded "crank" the man who spends his final dollar to influence the minds of thousands of persons who are longing for knowledge for its own sake.

Religion may have banished to the limbo of the past the angels that were imagined to be trotting on the point of a needle, as well as the combative arguments centered on oo or oi; but in the domain of God's Works the medal of honor, according to the human standard, still seems to be the largest for him who helps in the investigation and publication of the relative length and thickness of a hair, or in discovering the segmentation of a microscopic egg, rather than to him who gives evidence of nothing more imposing than the possession of a commonplace, plebian act of really loving and being influenced by that form of living animal that owned the hair or layed the particular egg. The fault, if fault it may be called, is with the public, not with the great philanthropists, These men will invest their money in monuments just as shrewdly as in stocks or goods, to make it go the farthest possible toward supplying what the public demands or applauds.

But some of us who are working in

the field of human life as influenced by nature look forward hopefully to the time when it shall be considered as commendable to help a boy or girl to observe the growth of a common plant as it shall be to enable a technical scientist to measure the length, breadth and thickness of that plant's microscopic stomata or to discuss learnedly its metabolism or the diameter of its ducts.

Let us pray for the day when the evangelist shall be as highly honored as the "higher critic" or the technical theologian; when the disseminator shall be as assisted as is the discoverer; when the popularizer shall be as greatly appreciated as is the inventor of polysyllabic names.



A TABBY AND A WHITE SHORTHAIRED DOMESTIC CAT.

BY C. H. JONES, ROCHESTER, N. Y.

Why do we call this cat a tabby? Because of the stripes. If he is brown he is a brown tabby, if gray a gray tabby, if orange he is an orange tabby with white and so on through all the colors. It is a common mistake to designate every cat as a tabby. Tabby means a marking of distinctive kind. Any striped cat is a tabby. If the cat has more white on the body than other color then it would be properly called a white with brown, or other color, tabby markings, providing these markings were in the form of stripes or regular markings.

It is called a shorthaired cat to designate it from the longhaired or Persian (commonly and mistakenly called Angora) variety.

From a fancier's standpoint this cat has a fairly good head and face, it being round and full, the ears, though, are a little large.

We can picture him as the carefully cared-for pet of some cat loving household. His freedom from nervousness, his attention to his mistress' call to give attention while his picture is being taken are evidences that he is free from nervousness and is ready and does properly fill the place required of a good "Domestic Cat."



A GOOD-NATURED TABBY CAT.

PETS AND CIVILIZATION.

BY C. H. ELLARD, COLUMBIA UNIVERSITY, N. Y.

The civilization of a people is measured in accordance with the beholder's point of view, and therefore by many standards. Few, however, give the domestic pet any credit for its part in moulding character, widening the horizon of thought, and bringing people into communion with the mysteries of nature, and with the omnipotence and omnipresence of our Creator. The men and women who deprive themselves or their children of the pleasure, the thoughts suggested and the diversion obtained from a hobby, are narrow and lack that "one touch of nature which makes the world akin." The civilization of the people or of the individual can to a degree at least be measured by the hobbies that they accept or reject.

The most popular amusement with our English cousins is keeping small members of our furred and feathered friends. The study of types and the development of new forms more beautiful or more striking in some feature that is odd or useful, has given the world horses, cattle, swine, sheep, poultry, pigeons, dogs, rabbits, cats, cavies, and even mice, all of which are adapted to propagate and promulgate some useful or beautiful characteristic.

That the American youth may enjoy his English cousin's advantages in the study of animals useful and ornamental, that he may have the opportunities and gain the training afforded by the care of pets, that American men and women, whose tastes are not all centered in the "frivolities," may be able to enjoy a clean, healthy hobby, although they cannot afford a racing stable, an expensive kennel, a cattle ranch or a sheep farm,—to achieve these praiseworthy results, an effort has been made to bring to their notice small, furred fancy-stock as pets, and each year the success of the movement seems to be greater. The project centered about a few fanciers who organized an American Fur Fanciers' Association for the mutual benefit of those interested in such stock, to encourage the exhibiting of types, and to increase the size, number and quality of such exhibitions.

Keeping pets of a doubtful sort has some advantages, but keeping some standard, well-tried varieties has a thousand times greater influence for good, while its care and management result in a training that adult or youth can ill afford to miss. There are ten standard varieties of rabbits, each with its own fixed scale in points of excellence, each differing in type and characteristics from all others, but all produced by the art of selection on the part of thoughtful fanciers, who have consistently followed definite ideals of beauty in form and color. It makes a difference whether you prefer the spotted English, the neat trim Dutch belted, the racy Belgian hare with his rufous coat, the huge and popular Flemish Giant dressed in his steel grey,



CAVY A FEW DAYS OLD NOT AS LARGE AS A SMALL APPLE.

Perfectly content (unlike an adult cavy posing) in the warm sunshine.

the fluffy aristocratic Angora, in his even admixture of white with its silver sheen, or the black and tan with its odd and pretty coloring, you will get both pleasure and profit from the breeding of any or all. You will have pleasure in the satisfaction of producing an approach to an ideal, in the diversion from care that the hobby will afford, and in the insight into some of the mysterious ways of nature; your profit will be in the annihilation of business worries and painful thoughts; the mind will be rested, the nervous system quieted, and if care be taken, your stock, will produce enough to be sold to advantage, and at the same time, will give you specimens worthy to compete with those of your fellow fanciers at some exhibition where your art

in breeding and in ideal is matched against another's in a friendly and stimulating rivalry. A place at or near the top will put you in a position to be envied by other breeders who will want some of your stock, with which, in the future, to surpass your results, if they may.

These advantages are by no means confined to rabbits. The little cavy so often referred to as "only a guinea pig," is of just as much use from the æsthetic point of view. These little animals are not so wonderfully prolific as one might gather from "just stories," as naturalists of the real sort term some published writings with cavies for the subjects. They are as clean as a canary bird and can be kept in a similar way. They exhibit definite standards of excellence for each of the three varieties and many of the sub-varieties

The innocent little mouse, despised and feared by women and elephants, is a favorite pet among those who become its devotees, and who perhaps, are at first attracted by the ease with which it may be kept, and by the fixed and definite excellence of its color varieties, which are greatly diversified.

Be they what they may, pets are an essential part of our civilization, a source of profitable study and delightful recreation, and even of "pocket money." Were more of them kept, were a greater number of boys and girls interested by their parents in some of the varieties, and encouraged to keep them, childrens' courts would be fewer, and fewer, too, would be the adults with nothing awakened with them in sympathy with nature and with the Creator.



IT WAS THEIR FIRST ACQUAINTANCE.

But whether of pleasure or surprise, it would be hard to say. They eyed each other perfectly still as if hypnotized.

NOVICES IN NATURE STUDY.

BY H. L. WOOD, M. D., GROTON, CONNECTICUT.

Nature study is the skillful interpretation of those signs by which is recorded the ancient as well as the modern history of animate and inanimate nature. As fancy leads, perchance we read this history written in rough lines upon the rugged surface of some rock of the glacial epoch; or observe it at the present day in the life cycle of the plant from seed to bloom, and back once more to seed.

Again we may read history in the course of the planets, in Mars, for instance, as she periodically approaches so distantly near, leading scientist and layman alike to speculate over the probability of this sister planet's being an abode of kindred souls.

It may suit still others, both in inclination and in facilities at their disposal, to devote their spare moments to the fascinating study of heredity, its influence and control, as observable in the occupants of the kennel, hutch or lofts of the fancier. Into whatever branch of this great work the fancy may lead if one is possessed of an investigating habit, he has an almost unlimited field at his disposal, and his success will be measured only by his skill as an observer.

The botanist must look to geology for the ancient history of his work; the biologist and fancier find many points in common, while the zoologist and ornithologist alike have come to respect the unclassified field lore of the farmer boy. It is unfortunate that, in the field of natural history as it has become popularized under the name of nature study, possibly more than in any other semi-scientific pursuit, there has crept into our literature much that is highly colored and misleading. Injustice has been done, and not a little prejudice aroused as a result of the "yellow" nature journalism, where imagination sees farther than the eye, and ambition for notoriety is greater than the ability to read the signs, or to select the fancied from the real. Truth is indeed stranger than fiction, and the realistic interpretation of Nature's wonder-works makes far more interesting reading than the weirdly distorted nature fable, supposed pen pictures by those who assume to be past masters in nature's school.

Flowery rhetoric and soul-stirring romance are not evidences of the writer's nearness to nature's heart. Many an old hunter and trapper who can with difficulty write an intelligible label for his bale of furs is possessed of a fund of nature lore that would make a valuable addition to our literature could it be put into print.

A magazine which, as a pioneer in this work, did more to awaken interest in nature study than any other of its time, was the old "Recreation" when under the management of that close observer and popular writer, Mr. George Shields.

It is not my purpose to advertise man or magazine, and I do not even know whether this periodical is still published, but I can say to the student looking for rare and reliable information upon natural history subjects, that if he can gain access to a file of "Recreation" 1890 to 1900 he will there find much of value. There is a growing demand for trustworthy popular literature by trained observers in all departments of natural science, and if I might suggest a title applicable to the need, it would be the partly borrowed one of "Literary Digest" of nature study.

To illustrate this, let me say that while recently writing about mice, I needed information regarding the striped Barbary variety of which little appears to be known. An exhaustive search of all known authorities left me still in the dark, until I accidentally stumbled upon an article by a lady who once owned a pair of these curiously marked creatures.

Like the professions of law and medicine the field of nature is so vast that to attain proficiency one must necessarily be a specialist and do one thing, and do it well. One may be an admirer of all branches of nature, a lover of all creatures on the earth, and in the water; but it is impossible within the limits of one life to become an authority as an observer of all.

To the novice in the field of nature study I would say, see some of everything when you are afield, but train yourself to see all of something. If your inclination tends to birds then determine to perfect yourself as an ornithologist. Note well their migratory habits, learn to distinguish their flight at a distance. Classify your varieties, what to look for in swamp, meadow and wood. Learn that the oven bird's nest is not found in the birch sapling as is the vireo's, or that of the nuthatch exposed to view.

Find if you can where bobolink spends the days of his molt, and why the snowbird appears with the snow.

Why are the eggs of the bluebird sometimes white but at other times blue, and what is the pigment that tinges an egg shell? Why at times do the black, at other times the brown, feathers of the bird become white? And why is the albino canary yellow? Verily the lessons from nature's storehouse of wisdom are not all solved.

A BIRD OF GREAT STRENGTH.

A bird which because of its rarity in addition to its strange appearance is a notable accession to the collection of the New York Zoological Society, is a magnificent ultramarine or hyacinthine macaw. This bird is seldom seen in captivity alive, and when one comes into a dealer's hands, it commands from one to two hundred dollars. Little is known of its habits in a wild state, but it is said to lay two white eggs at the end of a burrow scraped out of the side of a steep bank overhanging a stream. This macaw is the largest of its family and is wholly of a deep blue color. At the base of the bill and around the eyes are small patches of brilliant yellow, and the tongue is stained with the same hue. The enormous beak is black, dwarfing the huge mandibles of any other species of macaw. When it really wishes to escape from its cage, the strongest wire generally gives like pack thread, and the thickest hardwood perch is reduced to sawdust in an incredibly short period of time. But strange to say, with all this mighty strength, the bird shows a quietness of disposition and lack of ill temper which is unusual among its near relations. The hyacinthine macaw in the Zoological Park enjoys being fondled and caressed by its keeper, and if carried around on the hand, never, without provocation, attempts to fly away or to nip hard. Altogether, it is a most delightful inmate of the Bird House, and there is ever an admiring throng about its cage. It seems to enjoy this publicity, and revolves slowly on its perch,



A STRONG BIRD—THE HYACINTHINE MACAW.
Courtesy of the New York Zoological Society.

showing off all sides of its wonderful plumage. Sometimes it secures a firm grip with its feet and bill and vibrates its wings so rapidly that they become a bluish haze, calling out all the while in the thick and almost human utterances of its own strange vocabulary, the untranslatable language of the macaws.—*Zoological Society Bulletin.*

A REALLY SELF-SACRIFICING MOTHER.

Much has been written and said about the courage of maternal animals in caring for their offspring; much of their jealous devotion and faithful work in providing food; much of their skillful devices, cosy arrangements and comfortable burrows;



THE RABBIT NEST.

The naked little ones curled up in mixture of fur and hay

but in my opinion no other seems quite to equal the maternal rabbit. She pulls from her breast and sides great quantities of fur to build a nest for her naked little ones, and her depilation is evidently painful or at least decidedly uncomfortable. The process seems to border on tragedy, suicide or something equally momentous when it is considered only from a physical point of view, but when the observer thinks of the wonderful maternal instinct there exhibited, it becomes an admirable instance of parental care..

Although the breeding portion of the hutch may be liberally supplied with fine hay, the mother will cut parts of that into the fur, and within the mass will place



A NEAR VIEW OF THE NAKED RABBITS.

Separated from fur and hay.

additional layers of clean fur daintily arranged.

For two weeks after its completion it is not wise for the fancier to disturb this nest except for an occasional peep. At



THE PILE OF FUR IN ONE NEST.

about that time, the little ones will begin to venture out, or they will at least have a sufficient growth of fur to prevent them from being chilled by a brief opening of the nest.

One very cold day in mid-winter I lost an entire family of white Belgians by freezing. I took out nearly all the fine fur, or most of that not greatly contaminated with hay, and of this fairly clean nucleus I had a pile that filled a large sized dinner plate and was two and a half feet high! The mother rabbit seems to have realized the severity of the cold and to have gone to an extreme in depilation. Not much was left on her breast and sides, or that seemed to be the fact as I rubbed my hand over those parts, but, strange to say, she had removed the hair so evenly that in no place was the skin entirely bare nor the fur ragged. Its absence was apparent only to the touch.



MIRROR PHOTOGRAPHY.

There is a peculiar charm in a reflection. It is a "memory" of the present and doubles the pleasure. There is an indefinable appeal to the æsthetic emotions from seeing the thing from two points of view. Then, too, there is a scientific value. I have often wondered why mirror photography is not used more extensively by scientists and naturalists. We all appreciate a mirror photograph on a large scale, as when mountains or trees are

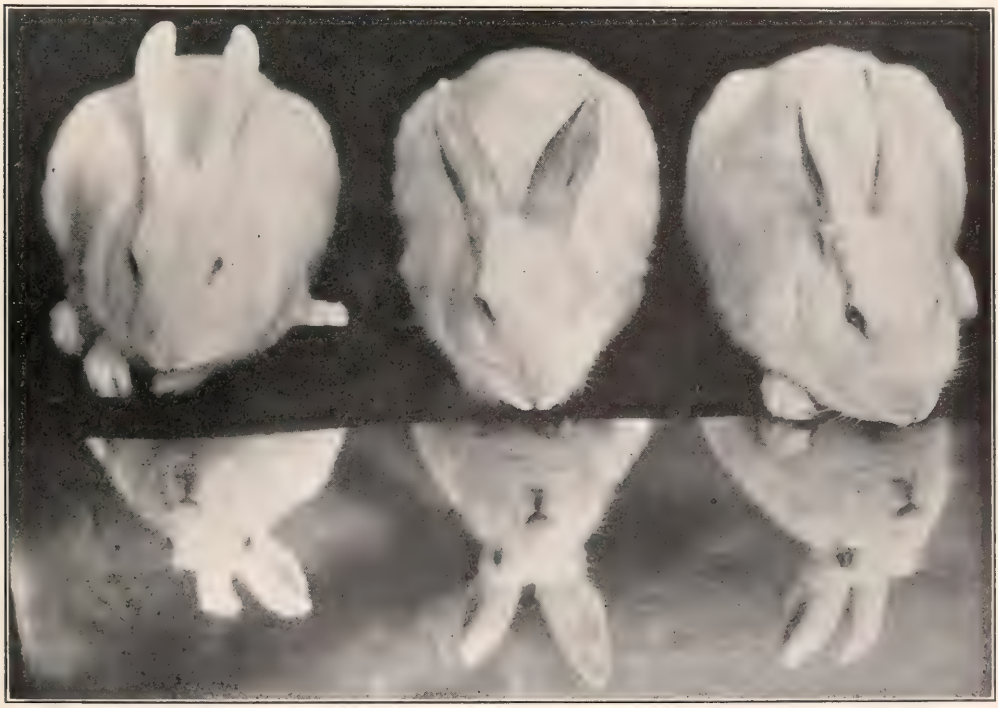


AN EXCELLENT EXAMPLE OF PHOTOGRAPHY IN A NATURAL MIRROR.
SHADOW LAKE, LIBERTY, N. Y.
Photograph by Mr. H. H. Moritz.



A MIRROR PHOTOGRAPH OF THE AA FLORAL EMBLEM.
Photograph by Mrs M. E. McDougall, Plattsburgh, N. Y.

reflected in a glassy lake. But here it is evident that the appeal is wholly to our sense of beauty, or to the novelty of the topsy turvy. All photographers take delight in work of this kind and vie with one another to get the most effective "turn in either way" results. But mirror photography has more than a novel or æsthetic value. Take, for example, that excellent "The Frog Book" by Miss Dickerson. Suppose some of the best photographs of her specimens had been taken in front of a mirror it would have given us an all round view. When one goes to a tailor to have a coat fitted, he is made to stand between triple mirrors and the tailor tilts and swings them in threefold directions to just the right angle so that basting threads and a one-armed "raggedy" coat projects into the



BELGIAN HARES. PHOTOGRAPHED IN MIRROR.

hope of the distant future, when the coat shall be finished. Why not let the naturalist see the "coat" of a frog or other animal or a specimen of plant life in the same manner? A photograph before a mirror will show at least two sides, and in such an object as a butterfly or moth



BOTH SIDES OF ONE BOUQUET.
Photographed in Mirror.

this is all important because it shows "over" and "under" in one view.

Everyone has noticed the increased loveliness of a bouquet when set in front of a large mirror. This enhanced attractiveness can be made permanent by the "eye" of the camera. Real beauty is not more than "skin deep," but it is beautiful all the way around. It seems a shame in photographing a beautiful bouquet to slight more than half of the flowers. This injustice is spared by a photograph in a mirror.

The only real difficulty in mirror photography is to put into the mirror any color of background to suit the subject. But this is not so difficult as it may at first seem. Set the object to be photographed in front of the mirror as if the mirror were the background. Then put the proper background at the side of the object and the mirror as far as possible from the source of light. Carefully swing the mirror, from the end next to the light, till it reflects the background at the darker side into the mirror. Then the original not only is "doubled," but both views stand out as if against a background. I have found it best to use non-halation plates, as these plates prevent any reflection halos.

I cordially advise nature lovers to use this form of photography for especially beautiful or interesting objects.

In photographing a series of specimens I have found it most convenient to lay the mirror flat in front of the row and then slightly tilt the front of the mirror till the background shows. Then the real background is back of the originals and the reflected background is back of the reflections. This, of course, is the usual method in water photography. The real sky is the background back of the real object and the reflected sky or clouds back of the reflection.

"The Guide to Nature" cordially invites contributions of mirror photography and will buy any that prove available to show further advantages in this interesting branch of nature photography.



INTERESTING ATTITUDES OF YOUNG CEDAR WAXWINGS.
Photograph by Edmund J. Sawyer.

PRACTICAL MICROSCOPY

Edited by Miss M. A. Booth, 60 Dartmouth Street, Springfield, Massachusetts.

ANNOUNCEMENT.

Ever since "Practical Microscopy" (of "The Observer" magazine) ceased to be published, we have received numerous expressions of regret at its absence and frequent requests for its continuance. Many subscribers have written us that they keep their files of "Practical Microscopy" for constant reference, and have urged us to give them more of what they deem such helpful literature. We are pleased to announce that this department is the successor of the first "Practical Microscopy," to be conducted along the same lines and by the same editor. It aims to be an informal, popular, practical, helpful, common sense department. Here we hope experienced workers will like to record their work and exchange experiences; beginners to bring their difficulties for solution; and that it may introduce thoughtful minds to the world of the infinitely little, an acquaintance with whose marvelous forms and adaptations will prove a restful, intellectual stimulus and pleasure. We ask our readers to tell this department what they are doing, seeing and learning. What microscopical literature have you read and what were its points which most impressed and helped you? What collections have you made and what processes have you used? We ask for inquiries and for answers to inquiries. Watch "Our Club" for items of interest. Let us hear often from our microscopical readers and let these columns promote the same friendly, cordial spirit and acquaintance among microscopists as in "The Observer" days.

There has been considerable inquiry as to the suspension of the work of the Postal Microscopical Club during the past winter. The suspension was but temporary and was due to the accident and illness of its President, Dr. F. R. Ward.

Among other good things for Practical Microscopy which we are promised for the near future are an illustrated description of the microscopical laboratory of one of our readers, a description of a card index for microscopical use and an illustrated article on mahogany wood.

The varied suggestions of our readers are well worth reading. We particularly endorse what one correspondent says about subscribers talking to each other through these columns. If our readers will tell us out of their own experience just the things they wish to know, the difficulties they wish to have solved, it will help us to provide the most acceptable menu. The columns of Practical Microscopy are open to its readers. Let us make it a rousing good journal!

THERE IS INCREASED INTEREST IN MICROSCOPY.

There are indisputable indications of a revival of interest in microscopy. Two years ago a dealer in microscopical goods and supplies wrote us, "There seems to be more microscopical interest than usual throughout New England. Several microscopical societies have been formed within the last year or two, and a hopeful state of affairs microscopic seems to be dawning." The same dealer has just written us of considerably increasing his stock of mounted objects

in response to a demand for them. Private letters from widely separated localities also report an increase of interest in the microscope. Perhaps, as a correspondent suggests, the pure food laws and their requirements for inspectors may have in part prompted the renewed interest in the revelations of "the magical tube." If, however, it is only a fad may it be a permanent fad! Never was there a more intelligent fad, nor one whose possessors disturbed their neighbors less. Microscopy merely as a recreation is a great mental resource; it furnishes unfailing food for thought and widens one's mental horizon immensely. Moreover it is an inexpensive hobby as compared with most other hobbies. There is the first cost of the microscope which can be governed by the length of one's purse, but the after cost is merely nominal for the great wide world of nature is free and one doesn't have to traverse a continent or cross an ocean to find it—lo, it is at our very doors! But in its serious fields of work what has not the microscope accomplished in conquering disease and saving life! Not to know how to use the microscope, not to be familiar with the microscopical appearance of common things, is not to be in consonance with the spirit of this progressive age.

EXPERIENCES IN COLLECTING.

Collecting *Volvox*. Noting the desire for localities for collecting, I give a few experiences. I have been greatly interested in the vagaries of Volvox as to its occurrence and disappearance. The first Volvox I ever found in any quantity I found in great quantity, so great that the water was green and thick with its abundance, and I collected it in a two-quart water dipper. The locality was a deep ditch in the woods in Longmeadow, Mass., where the bright sunshine penetrated and where *Drosera* grew and blossomed abundantly. Both soon disappeared, suddenly and unaccountably, and without the agency of the "axe of improvement." Next I found Volvox in a partially shaded pond in Forest Park, Springfield, Mass. With the bright sunshine and perhaps liberation of gasses in the water it came to the surface and as the coldness of night came on it descended to the bottom of the pond, so that the time for collecting was at midday. It was very interesting to watch the different states of the cell as the season advanced. The specimens photographed were collected in autumn, some of them ruptured for the exit of the young Volvox. In this pond, too, and with no apparent change of conditions, the Volvox suddenly and completely disappeared. Fortunately I had collected a good supply which I mounted in the mounting medium given by Dr. Stokes in "Aquatic Microscopy for Beginners," and instead of the Volvox cells presenting a mummified appearance as they often do, after ten years, some of them are fit for photographing, which speaks well for the preservative qualities of the mounting medium, inasmuch as a specimen cannot be too perfect for photographic purposes.

OUR CLUB.

In response to requests "Our Club" will again send out unmounted objects for the microscope, not indiscriminately, but to those who send descriptions of the methods and appliances which they have originated or adopted to accomplish desired results in microscopical work and research," and who at the time of sending the same enclose a stamped, self-addressed envelope to the editor of this department at 60 Dartmouth Street, Springfield, Massachusetts.

For May the club offering will be Spicules of Red Gorgonia.

ASKED AND ANSWERED.

How to Clean Gorgonia Spicules:—I have inherited large collections of curios, among them Gorgonias in considerable variety, which ought to yield me fine spicules. How shall I proceed in order to obtain the spicules in proper condition for the microscope?—F. H.

Books for the Amateur Microscopist: Will readers of Practical Microscopy please suggest a list of the most practical books they know for the amateur microscopist, treating of laboratory methods for invertebrate dissections and preparation of same for permanent mounts for the microscope.—G. H. M.

Books for Microscopists: With the increased interest in microscopy which the re-appearance of Practical Microscopy indicates, it seems to me that a list of books on general microscopy now most in use would be of interest to your readers. Of course, Carpenter is always a standard, but the last edition of Carpenter, "The Microscope and Its Revelations," the eighth edition, was published in 1901. Catalogues speak of Stewart's "Manual of Plant Anatomy," of Greene's "Vegetable Physiology," etc., etc.; but what we want is knowledge first hand from somebody who is using and found valuable books whereof they can speak, so that not only we may not part with our hard earned shekels needlessly, but that we may not fill our bookcases and particularly our minds with useless lumber.—E. J. L.

Very Low Power Photo-Micrography: In looking over collections of photo-micrographs one often sees prints where the amplification is very small, say only three or four diameters. These are undoubtedly produced by photographic lenses. Will some one tell us what kind of photographic lenses are used for such low powers, and whether used in the camera or by special mounting in the microscope? If the lens is used in the camera, how is the slide held for photographing so that it may be certain that every part of the field is in the same plane?—E. B. C.

SUGGESTIONS BY OUR READERS.

Practical Microscopy is not to be conducted in the interest of any personal hobby. Our subscribers will pay their money and it is proposed that they shall get a good deal more than their money is worth. In order that we may know just what the wishes of our readers are, as to the character of Practical Microscopy, we have requested suggestions, and some of them so well express our own ideas that we have obtained permission to print them, and they will be found interesting reading, full of ideas.

Experiences in Collecting is the subject of one reader's suggestion, and an excellent one, too. "I would suggest," he writes, "that notes on good localities for collecting diatoms, desmids and infusorial pond life would be acceptable."

Our Club: "I presume," says another, "that it meant much work to send out club material as was done to "The Observer" subscribers, but it was a very interesting feature and I hope it may be adopted by the new Practical Microscopy."

A Future for Practical Microscopy: "I am very optimistic in regard to the success of your undertaking," writes one who is glad to see Practical Microscopy in the field again, "for you have this great country of ours for your field, with a chance for overflow into other countries, and during the past ten years the interest in microscopy must have increased one hundred per cent. with all the nature work done in the schools and the discoveries made in the germ world and elsewhere. Nearly all the magazines and newspapers publish from time to time articles based on work done with the microscope, and that they are printed shows a popular demand for them, and straws, even, proverbially show which way the wind blows. There seems to be no journal just now which fills the want, the higher priced journals being too deep and too expensive for the amateur, and something is sadly needed to afford a medium for those interested in microscopy to exchange their ideas, get acquainted with each other and place on record the work that is being done in this line all around us. I believe it is only necessary to let these people know that such a result is possible and that by a little united effort such a periodical can be produced and you will find that you will soon have a journal strong enough to walk alone and fight its own way.

"Many of the amateurs of ten years ago are now professionals, those who have not attained that rank have had ten years of experience, and all of them must possess some item of interest which will appeal to the others. Microscopy is my recreation, and I subscribe to all the leading journals relating to my profession. Some of the leading and most popular journals that I take have been made so by encouraging their subscribers to talk to each other as man to man through their columns, telling each oth-

er how they did a thing, why they did it, and what the result was. One of these journals has a department of "Shop Kinks" in which the greenest apprentice, as well as the finished workman, is invited and encouraged to submit his ideas in even the crudest manner, and the editors put them into proper shape to make them interesting to their readers.

"I think there ought to be a similar department or column in Practical Microscopy where the novice or amateur can feel free to tell how he has done a thing and ask for advice on points he has in doubt. Such a column will appeal to the popular section of your subscribers.

"While I think it would be useful for subscribers to tell each other about the text-books they are using, I think that the suggesions I have made above, if carried out, would make Practical Microscopy of greater interest and more useful to the beginner and amateur than many of the books now on the market would be for the reason that if the readers can be made to feel that they are perfectly free to gain their experiences in the columns of the journal and get in touch with each other, they will find out many ways of doing things and points in technique that they will fail to find in many of the books on the subject for a great many authors seem to assume that their readers are already posted on these rudiments and leave the beginner all at sea on vital points which a few simple words would make perfectly clear to them. I own some of the best standard works on the microscope and its applications, but I cherish my volumes of 'The Observer' and of the Bausch and Lomb Company's 'Applied Microscopy,' and have the matter filed so it can be readily referred to. I read them over and over and find many things not mentioned in the standard books.

"Of course much of the matter would be an old story to professionals but they would find other contributions from writers of their own class, and, too, they should remember that one must be an amateur before he can become a professional, and thus what seems trivial to them now would have been very interesting to them at the outset of their careers. I am only one of thousands who must be waiting for that insight into this line of work and who when they get the proper start will enter into it with enthusiasm."

The suggestion of the exchange among microscopical workers of card index cards on microscopical subjects is original, up-to-date and excellent.

LITERARY AND BIOGRAPHICAL

A NATURALIST'S CAREER.

Like so many of those who have succeeded, Miss Ellen Rogers, author of "The Shell Book," (published on April 15th, by Doubleday, Page & Company) claims some of her best qualities by right of inheritance. Her father, Daniel Ferrard Rogers, the son of Nathaniel Peabody Rogers of Concord, N. H., the able jurist and anti-slavery reformer and editor of "The Herald of Freedom," was a man of broad education and experience, who through his intellectual and moral power soon gained leadership among the pioneers of his community, as a farmer, an educator, and a public-spirited citizen. Her mother, Ruth Llewellyn, was also a teacher before her marriage, and her splendid character and high ideals proved a source of inspiration not only to her eight children, but to all who came in contact with her.

The loyalty of these worthy pioneers, to the state of their adoption (Iowa) is shown by the fact that one daughter and three of the five sons, (all of whom are

physicians) are alumni of the State University, and a fourth son is now a student in the College of Medicine. Another daughter, Mrs. Mary Rogers Miller, of New York, has also distinguished herself as a lecturer and author.

Miss Rogers' preparatory education was obtained in the Adel High School Callanan College of Des Moines, and the Iowa City Academy. She entered the University in 1888, selecting the Philosophical course, and graduated with honor in 1892, being one of the six speakers. She gained membership in Phi Beta Kappa in 1902. During her entire college course she was an active member of Pi Beta Phi. She subsequently became a special student of Agriculture and Entomology for two years at Cornell University, Ithaca, N. Y., taking the degree of M. S. in Agriculture in 1902.

Miss Rogers has achieved notable success as a teacher. Before entering the University she taught in country schools, and in the primary grade in Dallas Centre, Iowa. After leaving the University she served as principal of the high school in Worthington, Minn., for two years, then as teacher of biology in the East Des Moines High School for five years, and in the Cedar Rapids High School for one year. Later she was instructor in the Cornell Summer School of Nature Study in 1900, and in the Chatauqua, N. Y., Summer Schools in 1903 and 1904. She has also been a most successful lecturer on nature study at teachers' institutes since 1900, chiefly in New York and Pennsylvania, but also in Michigan and in the Summer School of the South at Knoxville, Tennessee. Her first work of this kind, however, was done in city institutes in Iowa, with Hon. Henry Sabin.

Notwithstanding her success as a teacher, Miss Rogers is more widely known as an author through her two most notable productions, "Among Green Trees," published in 1902, and "The Tree Book," which appeared in 1905. Into these two volumes the author has gathered nearly eight hundred pages of interesting information, presented in pleasing form, and illuminated with a healthy, infectious enthusiasm which betokens a profound love for the natural world. Throughout these books the spirit of the teacher is displayed, and indeed they seem to have been suggested by the author's experience as a teacher of nature study. They have also been eminently satisfactory to those who love and appreciate trees, as well as to those who take a purely practical interest in their care and preservation.

"The Shell Book," Miss Rogers' latest achievement, is unique among contemporary nature books. It is the first popular book on the subject, gives a description of the species, the growth, food, habits and homes of living mollusks, industries such as pearl fisheries and snail-farming, the cultivation of oysters and other shell fish, instructions for making and maintaining aquaria without running water, and while scientifically accurate, is likewise charmingly simple, and will interest beginner and expert alike. The book contains eight plates in color besides ninety-six halftones from photographs—mostly the work of A. Radclyffe Dugmore.



MISS ELLEN ROGERS.

Author of "The Shell Book" and other books of nature.

The Agassiz Association

WHY NOT START AN AQUARIUM?

BY CHARLES M. GOETHE, (CORRESPONDING MEMBER NO. 2003), SACRAMENTO, CAL.

The opening spring is perhaps the best and most interesting time of the year for aquarium work. The needs are simple and inexpensive. First, you must have a glass receptacle. An old fish globe, a glass battery jar, such as telegraph companies use, or even a Mason's fruit jar, will suffice. Outside of this all you need is some good clean sand for the floor, and some pebbles, if your jar is large enough. Next you must be careful to keep the animal and vegetable life balanced. For the vegetable life you will find it sufficient to have perhaps a slip of "Wandering Jew," some of the green, slimy plant which can be found in ponds where water does not flow rapidly, and some "Duck Weed," that may be found on the surface of almost any still pond.

For the animal life get plenty of snails. You can catch these in almost any still water. They are the scavengers and will keep your aquarium clean. Then put into the water whatever water life you can find. If you have access to a Comstock's "Insect Life" it will help you with the names of the queer things you will find in the water. You are almost sure to find back-swimmers. Learn why they have this name. Also there will be a water boatman, and almost anywhere in America you can find some of the queer whirlagig beetles. You will also find some of the diving beetles. Watch how they carry their bubble of air with them. Then, too, you will find some of the water measurers. Learn how they manage to run on the surface of the water. Perhaps you will find the larva of the damsel fly, and will be able to learn how their gills are attached to the cadual end of the body. Perhaps you will find the larva of the dragonfly. See what you can find about his lower lip and how he uses it to catch his food. You will be almost sure to find some water tigers, and you will find how they get their name.

Perhaps somebody may say to you that an aquarium is not a healthy thing to have around. I have had them in my bedroom before I commenced sleeping out of doors, and at no time was there any unpleasant odor. There is no reason why they should not be healthy, although of course there is no reason why you should keep them indoors, as there is generally a place around almost any house where you can have them.

PRIZE OFFER.

In a personal letter, Mr. Goethe writes:

"I enclose a check for five dollars which I would be glad to have you offer in one prize of three dollars and two more of one dollar each, for the best article on 'What I Have Learned from My Aquarium,' to be written by children under, say twelve years of age."

In accord with this offer, contributions are invited. The contest will close September 1st.

FURTHER PRIZE OFFERS.

The Agassiz Association also offers prizes as follows: first, a beautifully illustrated book; second, a year's subscription to "The Guide to Nature." For the best and second best articles from nature students above twelve years of age on any of the following topics:

"Care of an Aquarium."

"A Garden for Plants" (not for beauty nor to eat).

"Mosses and Lichens."

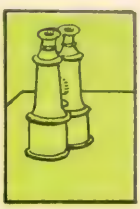
"Interesting Facts Regarding Pets."

This is five topics, two prizes for each. Contest closes November 1st.

AN ILLUSTRATED MONTHLY MAGAZINE FOR ADULTS. DEVOTED TO COMMONPLACE NATURE WITH UNCOMMON INTEREST.









THE GUIDE TO NATURE

Stamford, Conn.
Edward F. Bigelow, Editor.

Vol. 1 JUNE, 1908 No. 3

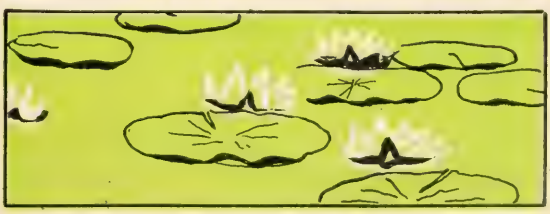














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PUBLISHER'S NOTICES

THE GUIDE TO NATURE wants a subscription agent in every community. Will our friends please recommend desirable persons for this remunerative work.

A PUBLIC EXHIBITION.

When you get a really sharp negative of a good nature subject, the best method of showing the positive to a company of friends is to have a colored lantern slide made by Charles Beseler Company, New York City.

This company also makes high grade stereopticon slides with a large variety of subjects, and rents or sells them in sets or singly.

THE PREMO CAMERA.

The editor of THE GUIDE TO NATURE has used almost every grade and size of Premo camera. Many of the illustrations in this magazine and in his articles in other magazines have been made with a Premo. It is compact and convenient —a good "all round" camera.

For an all day's tramp in the haunts of nature, the film pack is a great saver of weight. Twelve films may be carried in the space of an ordinary holder.

THE KODAK IN NATURE.

It is a very simple matter to use a kodak, that is, so far as hands and mechanical skill are concerned. The manufacturers have done everything possible to make every grade of kodaks simple in construction and convenient to use.

But to make the use in nature really worth while, to have the hand camera a means in studying, to make it depict things of value, is a more difficult task. The article by Mr. Howes in this issue is suggestive. This is to be followed by others on the use of the kodak. THE GUIDE TO NATURE will be pleased to have other suggestions along this line.

THE BIRDS AT HOME.

Bird nesting is now at its height. The birds have settled down as permanent residents. Now is the time for intense enthusiastic study, and an eight power stereo, made by the Bausch & Lomb Optical Company is an instrument with which to see them. The managing editor of THE GUIDE TO NATURE cordially recommends this "glass," because he has used it for several years and knows of its efficiency and superiority over all other forms of binoculars.

PRIZE ARTICLES ON AQUARIA.

Readers of THE GUIDE TO NATURE doubtless saw the offer of a prize for articles on aquaria,—page 68 of the May number. Aquaria may be obtained from any dealer, but in the writer's experience those supplied by the Kny-Scheerer Company, New York, are convenient, attractive and efficient. Dr. G. Lagai is a born and trained naturalist. He knows just the kind of supplies of all kinds that are useful to a naturalist. Write to him for his new catalogue. It contains lots of good things.

THE MODERN GUN.

There is a fascination in creeping up to game, taking aim, firing, and then bagging the victim. Theorize and study all we may, there still remains with most men, vestiges of the original hunting instinct. It is not essential nor even commendable to eradicate the instinct,— but to guide it into modern methods freed from cruelty. One of the best instruments for this purpose is the naturalists' reflex camera. It emulates the bow and arrow, and the gun of powder and shot. One has "to take aim" and "fire" in much the same manner. The "game also is bagged in the twentieth Century manner, the best of all ways.

BIRD-LORE

A BI-MONTHLY MAGAZINE

Edited by Frank M. Chapman.

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JUST THE PLACE IN WHICH TO GET "KNEE DEEP IN JUNE."

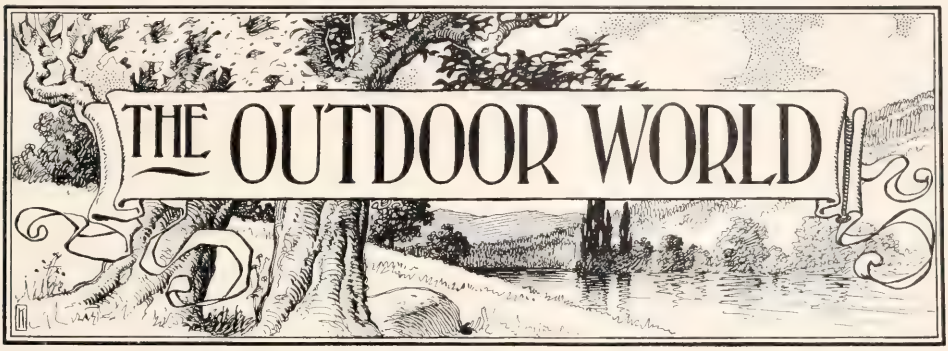
Photograph by J. R. Campbell.

Happy indeed is the naturalist: to him the seasons come round like old friends; to him the birds sing; as he walks along, the flowers stretch out from the hedges or look out from the ground, and as each year fades away, he looks back on a fresh store of happy memories.
SIR JOHN LUBBOCK.

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I JUNE, 1908 No. 3



A Night in the Maine Woods.

SOME OBSERVATIONS OF ANIMAL AND BIRD LIFE AT LAKE WEBB, WELD, ME.

By Harry G. Higbee,

Hyde Park, Mass.

ABOUT eighteen or twenty miles southwest of the famous Rangeley lakes, lies a beautiful stretch of water six miles long and from one to three miles wide, known as Lake Webb. This lake has an elevation of about 800 feet, and is set in a basin entirely surrounded by mountain ranges, affording some of the most picturesque scenery to be found on the American continent. It is fifteen miles from the railroad, but the village of Weld is settled snugly down among the hills on the east shore, with Mt. Blue rising up in the background to a height of about 3,400 feet.

Being surrounded as it is by mountains, and with forests on one side, stretching away for miles toward the great northern wilderness, and with the village and farm lands on the other, this locality is an exceptionally good one for the variety which it offers to the lover of nature, and for the study of animal life in its natural environment. In this vicinity, during the months of July, August and September, I observed eighty-seven varieties of birds, besides various other forms of animal life. The streams,

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of which there are a number flowing into the lake, are fairly alive with the beautiful speckled trout, and in the woods and fields along its shores and in the mountains nearby, bears, deer, foxes, and many smaller animals wander at will. Here, also, a great variety of birds make their home, finding a safe retreat in the cool deep woods, where they may build their nests and raise their broods unmolested, except by their natural enemies. Oh, that the hand of the wood-chopper might be stayed, and that such a beautiful spot might be left undisturbed, where the wild creatures could roam at will, and man might only enter for recreation and for the study of the lives and habits of the wild things about him.



"I PADDLED QUIETLY UP TO THE SHORE OF THE LAKE TO LISTEN TO THE SOUNDS OF THE WILD CREATURES."

In such a place nature unfolds her secrets to the one who seeks them in earnest, and each one of the beautiful creatures has its lesson for him who would submit himself to them and study their ways. It was a trip up the largest of these streams, known as West Brook, that I took one night, which I will describe and which is typical of the life in the Maine woods.

As it was a quiet and beautiful evening, in September, I left my little cabin in the woods about 11.00 P. M., and rigging my lantern on the bow of the canoe, I paddled quietly up the shore of the lake to listen to the sounds of the wild creatures, and to observe what animals made their haunts about the shores of the lake or the streams flowing into it. The scene was impressively calm and peaceful, and as I floated quietly along, there was no sound to be heard, except the occasional twittering of the birds migrating overhead. I sat there drinking in the beautiful scene and wondering what animals were wandering forth seeking their prey on the mountains yonder, which rose up from the lake and stood out in such bold relief against the sky.

Suddenly a great horned owl broke

the stillness with the weird, melancholy hoot, in the woods near the shore, and I knew some less wary bird or animal would soon fall a prey to its vicious beak and talons. Then the loud, hoarse laugh of a loon came answering back from out on the lake; and once more all was quiet. The bats came circling about my light, wondering, no doubt, why I could not see in the dark like themselves. Soon, again, the stillness was broken by the barking of a fox up on the mountain-side, and as I approached the marsh at the entrance of the brook, a great blue heron rose slowly up from the edge of the water, and with a low "squawk" at his being so rudely disturbed, he disappeared over the tree-tops into the blackness beyond. I then paddled slowly and noiselessly up the stream. Here was the



SUNSET AT LAKE WEBB, WELD, MAINE.



"IT WAS A QUIET AND BEAUTIFUL EVENING. * * * NO SOUNDS TO BE HEARD EXCEPT THE OCCASIONAL TWITTERING OF BIRDS."

home of the muskrats, and, startled by the light as I came along, they would turn from their course, and with a loud splash, would dive under the water, only to reappear, however, a few feet away. One curious fellow, a little bolder than the rest, swam out toward the canoe until within a few feet of it; then turning, swam up stream, keeping just ahead of the canoe, and turning every few feet to look again at the light, as if wondering what huge, one-eyed monster was thus invading their quiet domain.

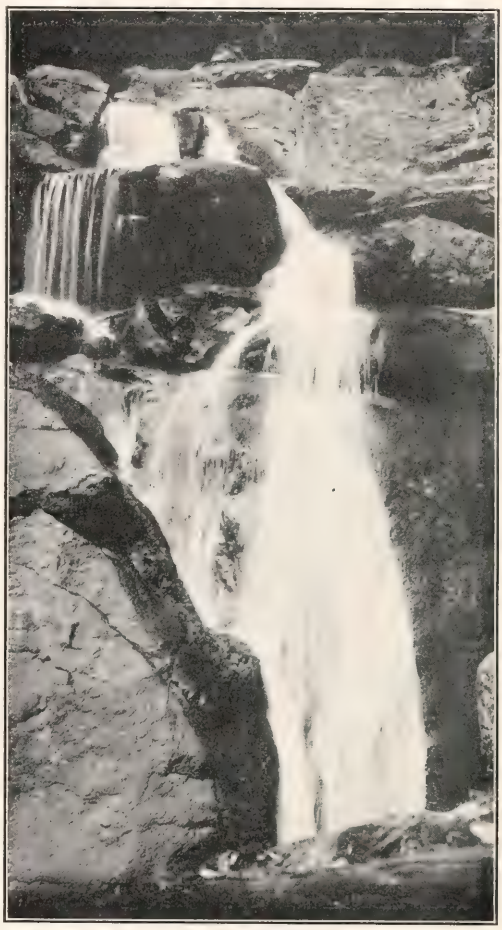
Soon I heard a sound that was new to me—a low whining—somewhat like that made by a porcupine. I soon found the author of it to be a muskrat, and discovered him sitting upon a log on the bank of the stream, evidently much troubled about something. No doubt I was the cause of it all, and as I came near him, with a jump that almost startled me, he plunged into the water and disappeared under my canoe. As I paddled along farther up the stream, a swamp sparrow in the bushes near the shore, would now and then burst forth with a little song, as if being disturbed in some sweet dream. Once or twice I heard deer walking along near the shore, but the brush was so thick I could not distinguish them. After making my way up stream as far as I could go, I paddled leisurely back to camp, only disturbing, near the mouth of the brook, a flock of black ducks asleep on the surface of the water. At my approach, they arose, with a loud "quacking," and flew farther out on the lake, where they might rest undisturbed, until daylight.

As I neared the camp, the loon laughed mockingly, across the lake, as if to say, "Ha! ha! you'll never catch me napping;" and the owl hooted "Good night" as I came out of the cabin and crawled into my sleeping-bag on the ground under the trees, to be lulled to sleep by the gentle swashing of the water against the shore and the sighing of the wind through the tree-tops overhead. It was now 2.00 A. M., and feeling well repaid for my three hours of wandering, and determined to go again at the first opportunity, I closed my eyes, and sank into that deep, refreshing sleep, which is one of the greatest blessings of life in the Maine woods.

THE REVELATION OF THE WHITE MOUNTAINS.

BY CAROLINE E. CLARK, NEW YORK CITY.

There is nothing so delightful, on this tiresome all-day journey to the moun-



GEORGIANA FALLS, NORTH WOODSTOCK, N. H.

tains, as the gradual change from the dust and heat of morning to the cool, clear air of late afternoon. As the car is no longer crowded and noisy, the body relaxes under the influence of a quieter, calmer and cooler atmosphere. How glorious has become the scenery! What a revelation when beheld for the first time! How beautiful the sunset, dazzling in its contrast to the dignified shadows of the sweeping mountains below; while serenely the new crescent moon rises over the hill-tops on the opposite side,—one brilliant star following

in its wake like a faithful satellite. This is life! This is nature in all her grandeur and undisturbed beauty. The dark woods so near your window, and the perpetual tumult of nearby mountain streams, hint that civilization has still to conquer and subdue the never-ending wonders of the mountain region.

There is regret in the fact that this state of intoxicated rapture must come to an end. To think of entering the noisy, lighted hotel with its hundred petty affairs; of eating dinner, unpacking and resting your weary limbs in sleep, has none of the attractions that such a prospect held in the morning! You have entered a kingdom which, in its heights and mystery of shadow and growth, rules with sublime dignity, the entire world of nature! To adjust yourself to the sound and sight of human beings within doors seems an impossible task after this effect of nature's magnificence has entered your own being!

But to-morrow—happy thought! The to-morrows of this world allow hope to live with perpetual fire in your heart. The to-morrows are the embers of the imagination which kindle the desire to live and enjoy.

When to-morrow dawns with a loveliness which you have missed, your physical needs so often seeming greater than your spiritual, you escape the hotel full of gossip, giggling girls, conventional tennis players, tourists and mere amusement seekers. The sun is shining almost fiercely in its efforts to shed as much light upon darkened mankind as possible. Its rays reach and warm you even when buried in the woodland paths that lead to some hermit abode or distant lake.

There are a thousand shades of green everywhere,—on the magnificent mountain-sides that come into view as you emerge for a moment from the wooded path, and in the woods themselves, that also reveal to you that mysterious sound of silence so dear to those who love nature. Some little mountain stream talks



THE CATHEDRAL WOODS, INTERVALE, N. H.

to you all the way, and in response, you plunge your hand in its clear depths and drink from your palm this wondrous water as cold as ice.

You feel the stirrings of present life and joy. Perhaps you are fortunate enough to come upon a wild deer, or to see a fox rush across the trail, almost in front of you.

Next, you climb some mountain-top. Its name holds no significance for you, for it is all a part of a marvelous whole, and as it reveals that whole to your responsive gaze you catch your breath, dizzy and amazed. There, below you, sweeps the famous Crawford Notch, while in the distance looms Mount Washington. You have become a mere speck in the sky. You imagine how small a bird must feel. You have never felt like a bird before, except in an automobile at sixty miles an hour. Now you are not a bird flying through the air: but instead you are as one that is perched on some high tree-top; a mere speck of breathing life beholding things as a whole. You feel that birds must be more broad-minded than men to thus always behold life from a height. Then at night, solitary and dreaming, you wander out to view the beauteous scene in the subdued light of the moon. At first dim clouds float across its face, like a veil that adds to a woman's beauty by only half revealing it. You are standing on the edge of a tiny lake, on the opposite shore of which, darkened woods stretch away into the distant mountain shadows. Soon, the sky clears, the veil has disappeared and



ECHO LAKE AND WHITE HORSE LEDGE.

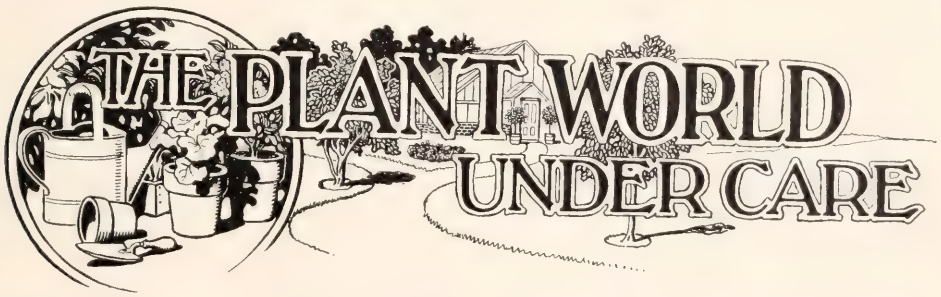
"Now you are not a bird flying through the air; but instead you are as one perched upon some treetop; a mere speck of breathing life beholding things as they are."

Illustrations from the Boston & Maine Railroad.

the moon is revealed to you encircled by rainbow-colored clouds:—A marvellous effect that you will never forget.

Alas! All too soon you are drawn into the world of humanity that has gathered under one roof from all parts of the universe, to flirt, to dance, to amuse itself for a month or so, and thus to enjoy a "change." But this is not the "change" you have been seeking. Humanity is everywhere and much the same. Here you have come to see the mountains, to let them teach you, so that in the drudgery of winter work their influence will still be over your soul. The result of this learning must ever stir your imagination and rest your weary brain in the midst of the city strife and overwork. And yet, in humanity, there is a certain claim that nature will never feel or give. These same glorious mountains may furnish the poetry in your life, but it is humanity that must furnish the prose,—you can live without the former but never without the latter.

After all, the young girl who came all the way up in the car with you has made a certain impression on your mind. After a day's journey by her side, as a stranger, you soon meet in the hotel and in half an hour are like old friends. This so-called complex creation is all very simple. The revelation which the mountains stirred in your own soul is nothing compared to the revelation of this girl's soul. It is she who draws you into an appreciation of humanity once more, and who, hereafter, shares with you those woodland walks and those sublime thoughts; which suddenly you discover she has experienced in greater or less degree since the years of her earliest understanding. The mountains had made you a poet, a contented dreamer, but the awakening to realities under the influence of sweet companionship was still more beautiful.



CHEMICAL TABLETS FOR FEEDING PLANTS.

BY EDWARD F. BIGELOW, STAMFORD, CONN.

(Reprinted, with revision, from "The Nature Study Review.)

I am requested to tell how I use in tablets the chemicals of Sachs' nutrient solution for the artificial feeding of plants. For those not familiar with feeding plants with chemicals I first quote briefly from Prof. Sachs:*

"The complete revolution which rational agriculture and forestry have experienced through the establishing of the theory of the nutrition of plants, proves how much has been accomplished in this department. It would extend far beyond the scope of this lecture to reproduce even briefly the substance of the literature of the subject. The most significant result of the development of the nutrition theory is met with, however, in the fact that we are now able to rear plants artificially—that we are in a position, with chemically pure water to which we add some few chemically pure salts, to rear artificially highly developed plants as well as the simplest algæ (and *mutatis mutandis,* also fungi)—that from inconspicuous and often scarcely ponderable quantities of vegetable substance, quantities of it as large as we choose may be produced in this way.

"Such being the favorable position of affairs, I regard it as the simplest and

[1]See Lecture XVII, "The Nutritive Materials of Plants," in Professor Julius von Sachs' "On the Physiology of Plants."

most instructive method to connect the main points of the theory of the nutrition of plants, so far as they concern the food materials, with the description of an experiment in artificial nutrition made with a highly organized plant. I think that in this manner the essential and

have added these three points: (1) Convenience of supplying the chemicals in tablet form. (2) Novelties in situations of growing plants. (3) A germinating case for scientific or popular observation and experiment.

This is how I came to use chemicals in



A LUXURIANT EGG-SHELL GARDEN.

Several common plants grown three feet tall from sawdust in egg-shell. Sawdust kept moist with water during germination and afterwards with the solution.

important points come into view more clearly than with any other mode of exposition. In the year 1860 I published the results of experiments which demonstrated that land-plants are capable of absorbing their nutritive matters out of watery solutions, without the aid of soil, and that it is possible in this way not only to maintain plants alive and growing for a long time, as had long been known, but also to bring about a vigorous increase of their organic substance, and even the production of seeds capable of germination."

I have utilized all that this honored botanist and others have recorded regarding artificial nutrition of plants, and

tablet form for feeding plants. I was familiar, as are most teachers of botany, with Sachs' solution from experiments made several years before in a university laboratory; but it took time for the suggestion to arise that the solution could be used aside from technical experiments, and by anyone as a common plant food. But one day light came. I ordered some of the mixture in bulk, put up loose in two-ounce packages. Later, as I saw a physician leave tablets for a patient and heard him refer to the convenience of these over the old method with powders and mysterious mixtures, the suggestion came to mind—Why not put up those nutrient chemicals in tab-

lets? I at once gave an order to a manufacturing chemist for 10,000 compressed tablets. This was in the early part of 1900. All that spring and summer I experimented with my tablets, as did a few naturalists to whom I gave a supply. We used the entire 10,000. They were found to work marvellously well, even beyond my fondest hope.

Each of the tablets is composed of the following: common table salt (sodium chloride) 2½ grains; plaster of Paris—gypsum (calcium sulphate), 2½ grains; Epsom salts (magnesium sulphate); phosphate of lime, nearly the same as burned bones (calcium phosphate), 2½ grains; East Indian saltpetre—nitre (potassium nitrate), 5 grains; compounds of iron and chlorine (ferric chloride), nearly 1-10 grain. To make the food solution two of these tablets are required for each pint (500 ccm. nearly) of water. Crush the tablets to be used and put the powder in the water. Shake or stir thoroughly before using. Keep the plants thoroughly moistened with this solution, which is both drink and food for them.

The solution prepared from the tablets will nourish a plant if the roots can be kept supplied with it, even on top of a stone, or a brick, between two sheets of glass, on crushed rock, sawdust, pebbles, bits of glass, or any similar insoluble substance. Plants thrive well on per-



TO SHOW GROWTH UP AND DOWN

Oats growing on mosquito netting tied over a tumbler. The liquid in the tumbler is the nutrient solution.



A DECORATIVE TANGLE OF PLANTS.

Grown in sawdust in a dripping pan. A profusion of white lupines and buckwheat.



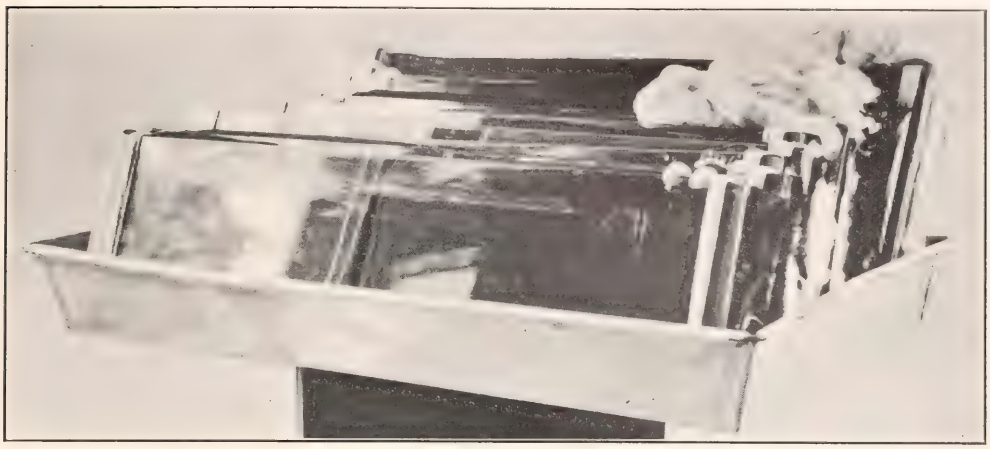
A GARDEN, WITHOUT SOIL, IN A WINDOW.
In center "agateware" pan cotton plants are growing in bits of crushed stone. In outer pans beans are growing in sawdust. Fed by the nutrient solution.

forated cloth or wire-netting stretched tightly across any receptacle that is kept filled with the solution. The photographs accompanying this article show some of these situations. But for novelty or scientific experiment there are many others equally good. Plants may even be suspended in mid-air and grown, if the roots are kept moist with the solution. Apply the solution to the roots in



THE BEAN GARDEN
Grown in sawdust in a dripping pan.

any way that you please, keep the stem and leaves in the light, and the whole plant will grow and thrive if it is kept



GERMINATING CASES ARRANGED IN CARD-CATALOGUE STYLE IN AN ENAMELED PAN.

By this arrangement space is economized and the roots in each case, except the one in front, are darkened by the adjoining case. A piece of black cloth may be used to cover the front glass. The excess solution poured over the upper edges is collected in the pan, and from time to time is used again to moisten the cotton above.

warm. I have not found so much advantage in keeping the roots in darkness as I had anticipated. In most of my experiments they have been wholly in the light. This is undoubtedly somewhat of a disadvantage to the plant, but to be able to watch the development of the roots adds greatly to the interest.

I have found the tablets helpful as a fertilizer, and large numbers have been sold as plant stimulants.

Contrary to the persistent belief or to the inquiries, let me say that the tablets do not germinate nor aid in germinating the seeds. They feed the plant after the tiny roots have been formed and are ready to take food. In fact, the application of the chemical solution in the very earliest stages of germination has seemed to me to be a disadvantage. To germinate a seed only three things are necessary: warmth, moisture and air. It will not germinate with only one or two of these. It must have all three. The tablet solution will not supply the warmth nor the air, and the moisture is better supplied by water than by the solution. Darkness is helpful, but not

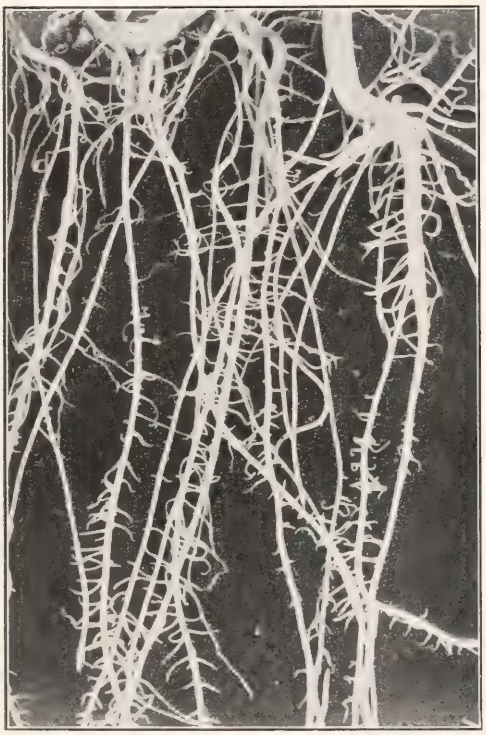


A LIVING CHART OF A GROWING PLANT.

White lupins, growing from successive plantings in a germinating case made of two sheets of glass tied together with cotton wadding next to the back glass and a layer of black close woven cloth between the wadding and the glass in front. The cloth is for a dark background and to force the roots to grow in one plane between the cloth and glass in front. The case is kept standing on edge. The seeds are planted on the upper edge between the front glass and the black cloth, and kept moist (with water until rootlets appear and then with the solution). Strips of cotton should be used to cover the edge and protect the seeds from drying until the plants begin to grow. At the end of two weeks there is a living chart showing successive stages.

an absolute essential for germination. Allow the seeds to sprout in the ordinary old-fashioned method on moist cotton, blotting paper, etc., or in soil, and apply the solution only to feed them as soon as the young plants tell you by starting their roots that they are ready for food. They may also be used to good advantage on potted plants.

For eight years I have experimented extensively with this solution by growing plants in a great variety of situations. This has not been work, it has been play, most enjoyable hours snatched from the pressure of many duties. I have come to love plants, not alone from the scientific or the æsthetic standpoint, but as pets. My desire has been to create and increase an interest and love for the growth of our common plants, in their entirety, as living things. It is not enough to know the flowers, not even enough to know the plants, that is at any one stage of their existence, in the sense of knowing either the name or structure.



ROOTS OF BEANS.
Grown between two panes of glass, so as to show clearly all details. No soil.

The message coming to us from the Great Nature-Study Teacher, regarding one species of plants, was intended I think to apply to all. He said "consider the lilies of the field *how they grow.*"

[*How to obtain the tablets.*—A box containing 30 tablets, with full directions for use, will be mailed for ten cents—a very small amount which is just sufficient to pay for the tablets, printing, packing and postage. I have no financial, only an educational interest in the sale. This low price is possible only because thousands of boxes are prepared at a time by a manufacturing chemist. Address Edward F. Bigelow, Stamford, Ct.]

INTERNATIONAL CHILDREN'S SCHOOL FARM LEAGUE.

BY MRS. HOWARD VAN SINDEREN, NO. 1, WEST 81ST ST., NEW YORK CITY.

In the spring of 1907 the friends of the Children's School Farm movement formed the International Children's School Farm League, to unify the interests of this movement in the United States and other countries.

It is the purpose of the organization to furnish practical information, opportunity for mutual help and to urge the introduction of Children's Gardens into school and park systems, as well as under private control.

The League is prepared to issue concise information as to how to start and conduct the work, to whom to apply in each section for proper advice and influence, to establish an exchange of photographs and lantern slides and provide the services of a lecturer and practical adviser.

Under the auspices of this League, Children's Gardens can be placed on unimproved property and introduced in connection with institutions for children and convalescents. The boys and men in the tuberculosis hospitals frequently say: "Oh! if we only had something to fill in the long hours." Wherever this work has been introduced in prisons it has proved most advantageous. For feeble-minded and backward children the garden is a most successful means of education. The gardens have proved a great boon to crippled children whose

misfortune disqualifies them from the activities of the ordinary playground and the street. The League responded to the request of the international Committee of the Educational Department of the Young Men's Christian Association for literature, photographs and general information which they sent out through their various Secretaries to interest boys to do similar work.



GIRL FARMERS IN DEWITT CLINTON PARK, 54TH ST. AND 11TH AVE., NEW YORK CITY.
The picture of boys (page 84) and of girls (above) are not special but typical of any day during the active season, and strangers can seldom realize from the photographs that they are secured in New York City below 59th St.

The Children's School Farm in New York City, 52nd-54th Street and Eleventh Avenue, founded by Mrs. Henry Parsons in 1902 and now conducted under her directorship by municipal authority under the department of Parks for the Boroughs of Manhattan and Richmond, has been so successful that urgent requests for advice and information in regard to the work have been received in such numbers that Mrs. Parsons could not adequately respond to them.

The general movement is spreading rapidly throughout the country and from

many places inquiries have been received asking about it:

How is it conducted?

Mrs. Parsons did not wish to form this League until she had worked out a comprehensive plan to fit the needs of



BOYS WORKING THEIR FARM IN DEWITT CLINTON PARK.
Boy writing in his diary in the foreground.

Where can teachers be obtained?

How can it be correlated with other school work?

What practical good is it?

normal, high, village, consolidated or training schools, city schools with congested conditions and recreation centers under boards of education and in parks.



THE FIRST CHILDREN'S SCHOOL FARM IN NEW YORK CITY, 1902.

This picture was taken with 90 children in the garden and is typical of the influence of the garden work toward orderly activity. *No teacher was*

Also to meet the needs of feeble-minded crippled and delicate children and for reformatories and prisons and had trained a secretary whose point of view would enable him to grasp and handle the situation.

Although children's gardens are not the cure for all the ills of life, they are the missing link which will help to solve many of the problems educators and philanthropists are wrestling with, for when properly conducted they should include nature study, entomology, botany, elementary agriculture, manual and physical training, household industries, mathematics, color work, composition, civics (covering individual ownership and the private care of public property) economy, thrift, hygiene and many other subjects vital to mental, moral and material prosperity.

The Children's School Farm at the Jamestown Exposition was the first public work of the League, and an answer to many of the inquiries regarding the movement.

The comments of the visitors and of the parents of the children who have worked on the farm give an indication of the many useful sides of the movement. A gentleman from Philadelphia, after watching the work go on, summarized his opinion with the remark, "You are teaching children to be of some use in the world." A mother of a small farmer, in the most enthusiastic language, said, "You have taught my children something I thought they would never learn, the importance of little things." Another mother, who had visited the Farm several times, had examined carefully our very simply-equipped kitchen and watched the children at work. Her interest had been so aroused, because as she said, "the Children's School Farm this summer has excited in my daughters an almost unbelievable interest in the house-keeping of their own home." One little girl, while being shown how to mop a floor remarked, "I never did anything of this kind before I came to the Children's Farm, but mother says it is a very good idea for me to learn housework."

While the whole scheme is entirely new to the majority of people and there are almost endless details about which they have asked questions, the two things which have appealed to the public and excited their interest more than all the rest, were the simplicity of the equipment and the very evident interest of these children in the homely duties of the little farmhouse, workshop and garden. To be sure, this work has been presented to the children in a new light and in a different spirit, nevertheless, they did much hard work which soiled their hands and tried their patience, and they have, in some degree, come closer to the mysteries which surround their daily lives and gained a much higher conception of manual labor.

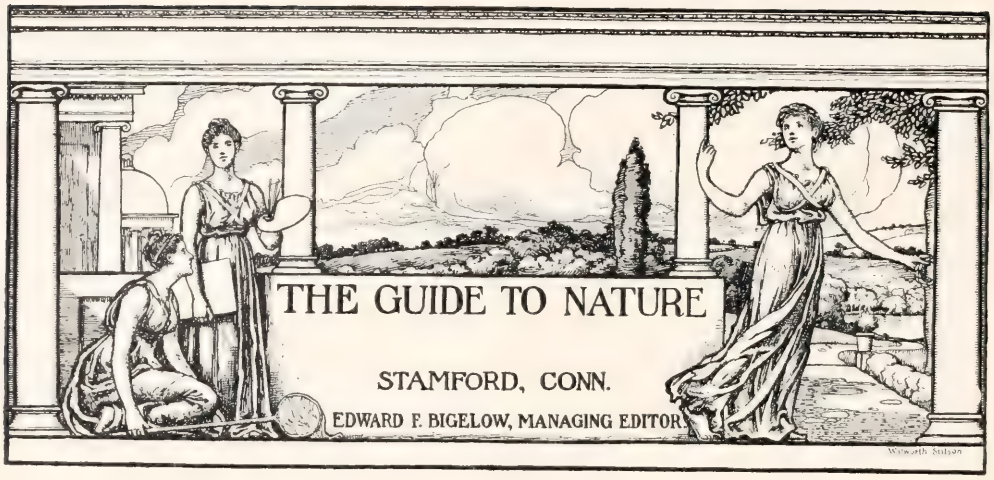
The air is pulsating with the Children's School Farm movement. It is useless to attempt to send children into the country from the cities unless they are first taught something of the Book of nature. It is useless to attempt to keep the farm children at home unless the Book of Nature is attractively interpreted to them. The school garden is the only practical method to bring about these results.

Promoting the class for training teachers in children's school gardens in connection with the New York University Summer School will be the League's special work this season. This Department of School Gardens is under the directorship of Henry Griscom Parsons, the League's Secretary. The class was established in 1906 under the most ideal conditions. The course is designed to prepare teachers to take charge of or teach in children's gardens. The course consists of lectures and laboratory periods. The lectures take up the theory and practice of the work; the laying out and planting of the garden; soil, plant and fertility problems. The needs of different localities are considered. Attention is given to insect life and methods of presenting it to children. The laboratory period is spent in the workshop and garden, where the students do all the practical details of actual work. There is a beautiful grapevine arbor running across the garden which affords shade for short talks. The lecture course is given out under the fine old trees on the campus, from which a beautiful view of the Hudson and East Rivers can be obtained. The course is from July first to August eleventh. Send for particulars.



THE FIRST CHILDREN'S SCHOOL FARM IN NEW YORK CITY, 1906.

This picture shows the building and part of the garden in DeWitt Clinton Park, 11th Ave. and 54th St., as it is 1908.



JUST AS WE ARE.

THE GUIDE TO NATURE is an attempt by an Association of nature lovers to produce a nature magazine really worth while. It is yet far short of its ideal, but even now, with all its imperfections, it is undoubtedly the most successful attempt to publish a periodical for nature lovers. It is better patronized, it contains more valuable and instructive matter, is better illustrated, is more attractive mechanically, and, its prospects are in every way better than those of any other similar publication in this country.

ADVICE AND SUGGESTIONS.

It takes many people to make a magazine, and it takes more to tell what the magazine should be. Most persons vote silently, for or against, that is they subscribe or they do not. Suppose every person who has subscribed would tell fully why he did so, and every person who has seen a copy or announcement and didn't subscribe, would tell why he didn't! How clear it all would be to "guide" aright.

But being surrounded by a silent company is like steering in a fog, with only one's own ideas and sometimes mere guess work to direct one's course. Please let the sunlight in so that we may see the channel and the objects on the shore. Please write and tell us what you want, what you don't want, and why.

FOR THE SPECIALIST.

Many copies of the Prospectus of this magazine were sent to various specialists in various departments of nature science, and, we are grateful to say, that from these specialists we have received a liberal number of subscriptions, and not a few contributions. Most of this clientele seems readily to understand the scope of THE GUIDE TO NATURE, and all is well and happy.

We naturally expect that it will take a new thing some time to grow, to find its true form, and to adapt itself to its surroundings. This fact is true of THE GUIDE. But in the main the ideals of its forms and adaptations are clear and sharp. This magazine is to be pre-eminently a magazine for the specialists, but not in all his needs nor in his major part. Professor William F. Ganong, in his book, "The Teaching Botanist," well defines a specialist. He says:

"Specialization is by no means a selfish isolation in a narrow line of interests, but rather it consists of making one's greatest interest the axis for the grouping of the others. The conditions of modern life have settled it for us that the well-educated man is a specialist, one who knows something well, it matters not so much what, and has sympathy for other things."

No one magazine can represent for all specialists the "know some thing well," but THE GUIDE TO NATURE can and will

fully represent the "sympathy for other things."

Then, too, it is for the specialist to inspire in others a "sympathy" for his "things." For that most commendable purpose every specialist is invited to use our columns freely.

OUR ENGLISH TWIN.

Born at the same time (Vol. I., No. 1, April, 1908) and of the same parental plans—"for the interchange of knowledge and ideas between all students of nature and lovers of country life," is "Country Queries and Notes," at 2 and 4 Tudor Street, London, E. C.

The editor, E. Kay Robinson, in his salutatory "Ourselves," says:

"And we venture to think that such a journal has long been needed by a large number of excellent people whose sympathies frequently turn from the narrow topics of society, business and public life to the wide world of nature. No matter how vexatious may have been the worries of daily work, the student of nature and lover of the country finds all the refreshment of a mental plunge-bath when he turns again to the hobby of his leisure hours.

"But pleasure is always doubled when it can be shared with others; and one great drawback of the study of nature, compared with most occupations and pastimes to which men devote the best thoughts of their leisure hours, has been its solitariness. It is true that when one is alone with nature one is in the best of all company. There is no solitariness then. But it is afterwards, when one is flushed with new experiences and new ideas, that one feels the need of kindred minds to discuss their meaning and analyse their value. Hitherto the nature student has perforce accustomed himself for the most part to live a lonely life apart from the noisy crowd that follows politics, sport and pleasure, becoming by degrees a living storehouse of locked up knowledge. It is lamentable to think of the thousands of men and women who have trodden in the steps of Gilbert White, making intimate acquaintance with the wild life of our country, and have died, leaving none of their knowledge behind for us. Painstaking observers of nature have not, as a rule, any itching for publicity; and of no branch of human inquiry can it be more truly said than of nature-lore in Britain that 'those who write do not know, and those who know do not write.'

"But in congenial communication with fellow seekers after nature's secrets the pen of the naturalist moves freely; and it is our ambition to supply a permanent medium for all who have thoughts or facts to exchange regarding any branch of natural history."

By an interesting coincidence the editor has an article in department "Woman in the Country," on millinery from the garden, but the writer does not limit the decoration to everlasting flowers, nor even to flowers, but includes fruits. She says:

"I always think that flowers and feathers in country hats are out of place, except, perhaps, for what might be called the 'Sunday-go-to- meeting' hat. Even for our best, however, why not, especially in the summer, use natural flowers. Have a straw hat trimmed prettily with ribbon or chiffon, leaving a space at the side or front of a bunch, say of roses or carnations or whatever flowers are in season.

"When I lived in the country, and now when I am out of town for week-ends, I decorate my hats with blossoms and buds from the garden. I keep green-covered wire especially for twisting up bunches of flowers.

"I remember some years ago, when my father was the vicar of a country parish, I used regularly to resort to the garden on Sunday morning and gather myself a suitable hat-spray or bunch. I believe I sometimes distracted the attention of the devout worshippers, who weighed the pros and cons of my floral hats, during divine service!

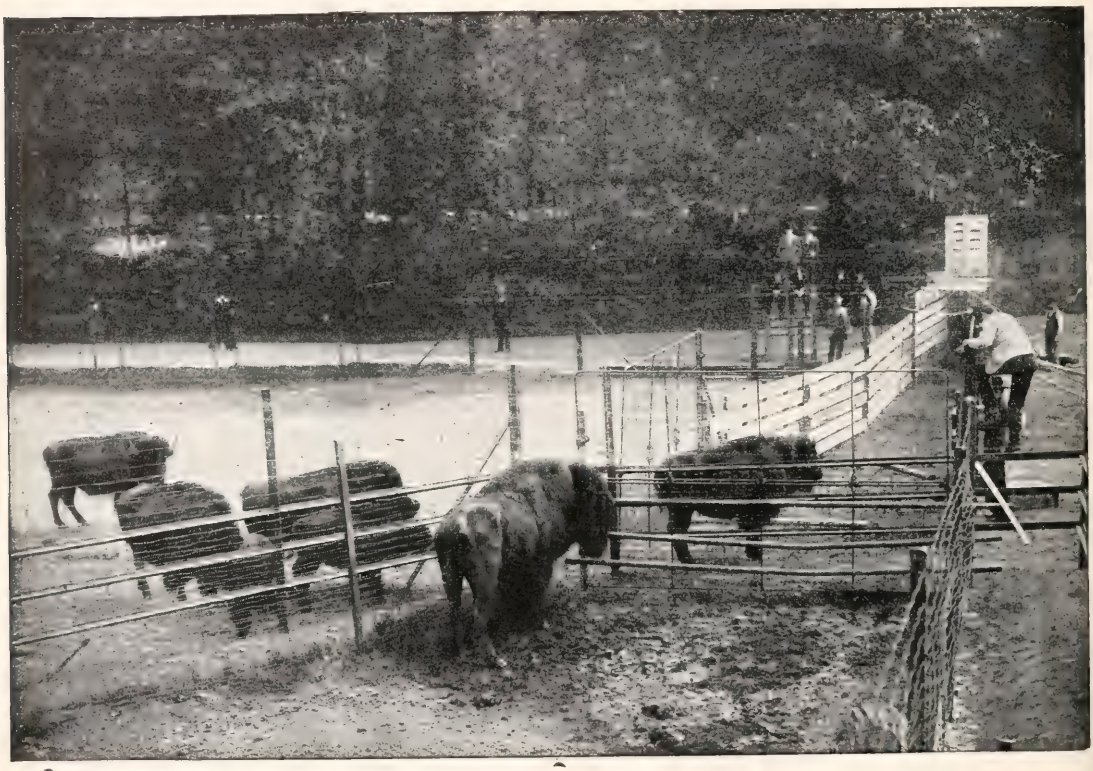
"I recollect hearing of the remarks made by an exceedingly prim spinster who took exception to my headgear and denounced the vicar's daughter for 'wearing natural flowers in the House of God'!

"However, I continued in my disgraceful(?) course, and even had a bunch of ripe red cherries on a string-coloured straw hat, round which was twisted some green chiffon. The effect was really very pretty, and I recommend my readers

to try this economical and artistic mode of trimming their spring and summer hats.

"Needless to say it is very advisable to select flowers of a sort and condition to last well, and if their natural foliage is of a kind that fades quickly, there is plenty of greenery which may be mixed with the blooms and form an effective mounting."

The recently issued annual report of the Society shows that the plan has been very carefully thought out. A year ago the organization engaged Professor Morton J. Elrod, of Missoula, to spend the summer of 1907 in making a thorough examination of the Flathead Reservation, which now is being thrown open to settlement, and recommend a site for a national bison range. Professor Elrod's report is printed in full in the Society's annual volume, and upon it is based the plan now before Congress.



SEPARATING THE SELECTED STOCK FROM THE MAIN HERD.

"A chute, fifty feet in length, had been erected between the two main corrals fronting the Buffalo House, communicating with both and terminating with a very ingenious sliding iron gate. Against this gate the crates were placed. The herd of fifteen was driven into the north corral, and the animals, one at a time, liberated into the chute."

Courtesy of the New York Zoological Society.

SAVING THE BISON.

Through a bill recently introduced in Congress by Senator Joseph M. Dixon, of Montana, the American Bison Society has formally called upon the government to establish a national herd of bison on the Flathead Indian Reservation, in northwestern Montana. The Society offers a nucleus herd as a gift, if Congress will provide the land for a range, and fence it in.

Unfortunately the Society came into existence just one year too late to prevent the sale and removal to Canada of the great Pablo-Allard bison herd, which had grown up on the Flathead Reservation from 30 animals to a total to-day

of 638 head, not counting between 200 and 300 head previously sold. The history of that herd, however, has amply demonstrated the fact that bison suitably located on the flathead Reservation can live all the year round by grazing, and without being fed on hay.

The site proposed for the new national herd is situated immediately north of Ravalli, on the Northern Pacific Railway, which is the station from which 398 bison were shipped to Canada last year. The ideal range desired contains 20 square miles (12,800 acres) of ridges and hills, nearly all of it too steep for agriculture of any kind, and of no value to anyone save as grazing lands. In the ravines and watercourses there is an abundance of water, and sufficient timber to afford shelter for bison in the severest storms. The grazing grounds are abundant for the support of 1,000 bison, without the necessity of feeding them. The proposed ideal range has a frontage of seven miles on the Northern Pacific Railway.

Unfortunately the Indians will have to be paid for any land that may be set aside for a bison range, probably at the rate of $1.25 per acre. To accomplish this purpose, and to provide for fencing, Congress is asked to appropriate $30,000. If this is done the Bison Society will at once set about the task of raising funds for the the purchase of a herd of from 15 to 20 bison, of pure blood, to present to the government for the new national range. In comparison with the great sum that is being expended by Canada,—between $150,000.00 and $200,000.00—for the purchase, transportation and care of the Pablo herd, the sum now asked of Congress seems very small. In view of the object to be gained, it is trivial. The American Bison Society is backed by a strong board of managers, and there is reason to believe that it will make a very vigorous campaign in behalf of the proposed new herd.

One of the most interesting features of the Society's annual report is the bison census, which was made by Dr. W. T. Hornaday, and completed on January first. Its summary shows the existence at this date of 1,722 pure-blood American bison in captivity, throughout the world, and 325 head (estimated) running wild. Of the latter 25 are credited to the Yellowstone Park, and 300 to the region southwest of Great Slave Lake, in Canada. In the United States there are 1,116 bison in captivity, of which 506 are males and 610 females. Of this total, 203 are calves that were born in 1907. Canada now contains 476 captive bison, of which 214 are males and 262 are females, 98 of the total being calves of the vintage of 1907. Europe contains 54 male and 76 female bison, of which 22 are calves of the past year. The grand totals for the world, of captive bison, are 777 males and 948 females; and of these 323 were born last year.

In 1903 there were living in captivity a total of 1,119 American bison. It thus appears that since 1903 the total net increase has been 603 head. If these bison were all owned by national or State governments, the future of the species would be far more secure than it now is with these animals in the hands of *sixty-four different owners!* The temporary tenure of private ownership constitutes a great danger to the species, and renders the establishment of several national herds imperatively necessary.

In advocating before Congress the establishment of the proposed national herd in northwestern Montana, the American Bison Society desires the active assistance of all persons who are interested in the perpetual preservation of what once was our most conspicuous and valuable American animal. The thing to do is to request Senators and Representatives to facilitate the passage of Senator Dixon's bill.

BUMBLEBEES FOR THE PHILIPPINES.

Clover is one of the most valuable plants in the whole range of agriculture, and the lack of it has been severely felt in the Philippines. The plant is not only valuable as pasturage for certain animals, but it actually enriches the soil on which it grows, instead of making it poorer. If you pull up a handful of the first bunch of clover that you see in your path, and remove the adherent earth, you will observe that the roots are studded with irregular nodules, each about the

size of a pin-head. Section these little bodies, examine them with the proper magnifying power of the microscope, and you will find that they are filled with minute bacteria which, as is well known, have the ability to absorb from the air the nitrogen needed by the clover, and to supply the soil with the nitrogen of which it too has need. The bacteria supply to the clover the substance that it must have to thrive, and the clover gives to the bacteria what to them is desirable for their welfare, but which to it is a waste product. To the farmer the plant is important, since, among other purposes dear to him, it may be used to restore the fertility to an exhausted soil. But aside from this valuable quality, clover without seed is unmanageable, and without bumblebees clover will not produce seeds. Bumblebees are therefore one of the farmer's most valuable assets, and to assist in the cultivation of clover, bumblebees have been carried from England to New Zealand, and from the United States to the Philippines.

In his "Origin of Species" Darwin says: "Humble-bees alone visit red clover, as other bees cannot reach the nectar. It has been suggested that moths may fertilize the clovers; but I doubt whether they could do so in the case of the red clover, from their weight not being sufficient to depress the wing-petals. Hence we may infer as highly probable that, if the whole genus of humble-bees became extinct or very rare in England, the heart's-ease and red clover would become very rare, or wholly disappear. The number of humble-bees in any district depends in a great degree on the number of field-mice, which destroy their combs and nests; and Colonel Newman, who has long attended to the habits of humble-bees, believes that 'more than two-thirds of them are thus destroyed all over England.' Now the number of mice is largely dependent, as every one knows, on the number of cats, and Colonel Newman says, 'Near villages and small towns I have found the nests of humble-bees more numerous than elsewhere, which I attribute to the number of cats that destroy the mice."

While the bumblebee is satisfying its taste for nectar, it naturally becomes dusted with pollen which it carries to another head of clover, thus effecting the necessary cross-fertilization. The ordinary honeybee will not do this for the red clover, because the proboscis is too short to reach to the bottom of the deep and narrow blossoms, where the nectar is stored, but the bumblebee's long proboscis is well adapted to the purpose. Hence it follows that with no bumblebees, no clover seed; plenty of bumblebees, plenty of clover seed.

In the Philippines there were no bumblebees and no clover, until both arrived from the United States. The clover, as a desirable citizen, got there first with the usual seedless result. But the Bureau of Entomology in the U. S. Department of Agriculture, has sent a collection of bumblebees in charge of two returning Filipino students, and another later consignment by one of the transports. Professor L. O. Howard, Chief of the Bureau, reports their arrival in good condition, with every probability that they will become established.

It has been said that "The Filipinos with their scanty clothing may have some painful adventures before they learn to treat the American bumblebees with proper respect. Almost any person who has had experience would rather be stung by a honeybee than a bumblebee. A bumblebee is a splendid thing to keep away from when his temper is tried."

WHAT IT ALL MEANS.

"To add to the resources of one's life—think how much that means! To add to those things that make us more at home in the world; that help guard us against ennui and stagnation; that invest the country with new interest and enticement; that make every walk in the fields or woods an excursion into a land of unexhausted treasures; that make the returning seasons fill us with expectation and delight; that make every rod of ground like the page of a book, in which new and strange things may be read; in short those things that help keep us fresh and sane and young, and make us immune to the strife and fever of the world."—*From the introduction to The Nature Library, by John Burroughs.*

CORRESPONDENCE AND INFORMATION

A FAMOUS MUSK-OX HEAD.

Zoological Park, New York City.

TO THE EDITOR:—

The national collection of heads and horns, at the Zoological Park, has just received a notable and valuable musk-ox head as a gift from Warburton Pike, of Victoria, British Columbia. All readers of Arctic travels, and all hunters of big game, know Mr. Pike as the author of that finest of all works on northern Canada, entitled "The Barren Grounds of Northern Canada," published by the Macmillan Company in 1892. Among books of its kind it is a classic. It describes Mr. Pike's daring and even terrible trip in midwinter into the country of the musk-ox and barren ground caribou, from which he brought out the first detailed and authentic information ever given in the world regarding the barren ground musk-ox on its native heath. His book was the *motif* of all subsequent hunting expeditions into that desolate, and in winter terrible country.



HEAD OF MUSK OX.
Courtesy of the New York Zoological Society.

Mr. Pike is a resident of Victoria, British Columbia, and owns a gold mine in the Dease Lake region. A year ago he passed through New York, and was made much of by the big game hunters of New York, at the Boone and Crockett Club, and in the Zoological Park. From the first he has been keenly interested in the movement for a national collection of heads and horns.

The musk-ox head recently received from Mr. Pike is the largest and finest trophy of his famous expedition. It appears in Mr. Rowland Ward's "Records of Big Game," well up near the top of the list of "record" heads of musk-ox. Its measurements are as follows:

Length of horn on outside curve. 26⅞ in.
Distance between tips of horns... 27 in.
Width of horn at base..... 11 in

The hair under the chin is about a foot in length.

The head was mounted by John Fannin, late curator of the Provincial Museum at Victoria, and is in a fine state of preservation. Its colors are apparently as fresh as when, in a temperature of 30 degrees below zero, in a howling gale of snow, the owner was shot, decapitated, and devoured—all save this head,—by five desperate men and a dozen hungry sled dogs.

W. T. HORNADAY.

FEEDING GREY SQUIRRELS.

Lowville, N. Y.

TO THE EDITOR:

The late frosts of the spring of 1902, which proved such a blessing in disguise by ridding our section of the country of the tent caterpillars, were most unfortunate for the squirrels. The tender flower-buds of the beech, butter-nut and other trees upon the fruits of which they depend for their winter's supplies

were destroyed and the subsequent autumn brought them no nuts. No doubt many squirrels perished of starvation during the severe winter which followed, but our picture shows one of a pair of fine gray squirrels which fared otherwise.

The nut-famine drove them from the forest, and they made their way to a



THE WILD GREY SQUIRREL.

corn-field near our house, where they found an ample supply of food in its golden kernels. When the crop was harvested, however, this supply was cut off, and, with surprising boldness for animals so shy as the gray squirrel ordinarily is, they ventured into the trees of our door-yard. Realizing that they must have been driven to us by scarcity of food we were very glad to supply it to them, and also comfortable quarters for the winter. We filled a box with warm bedding and a lot of butternuts and corn, and fastened it in a large sugar maple tree near our kitchen window. To introduce them to their prospective home we fastened ears of corn at intervals along up the trunk to the box, and one ear was left protruding out of the entrance. To be doubly sure that the squirrels would go into the box and see what nice accommodations we had for them there the ear was fastened in the entrance so that they could not pull it out, and they would have to go in in order to get the corn on the farther end of the ear.

The plan worked admirably, and ere many days it was evident that the visitors had resolved to search no further for a winter home. This just suited and during the cold days which followed the handsome fellows were often seen sporting about the tree or digging in the snow about it for the extra nuts which we supplied from time to time. We would often wire ears of corn to the trunk for them, and these they visited regularly for their morning meals. It was while one of them was about to partake of its breakfast one day that we made the negative used for our picture.

Note the fine fur of the wild squirrel as compared with that of the tame ones of our city parks. Unfortunately the very large and bushy tail of our subject was in such a position that it shows only in part. It was even larger than the squirrel's body.

We very much hoped that these squirrels would make their permanent home with us, but all the inducement we could offer seemed of no avail, for on the advent of the warm days of spring they betook themselves to the woods and we have not seen them here since.

ROMEYN B. HOUGH.

ANIMATED LEAVES.

Conneaut Lake, Pennsylvania.

TO THE EDITOR:—

All tourists in Southern California have admired the pepper tree, with its large clusters of rose-carmine berries and its dark green, fern-like leaves; but few have ever discovered the curious phenomenon attending the latter.

If a leaflet is broken transversely into about three pieces and these placed on the surface of a shallow plate of water there will usually follow, in a few mo-

ments a series of sudden jerks, as though the fragments were really imbued with life. The manifestation is at some times more pronounced than at others,—the rules governing this being yet unknown to the writer. Usually the best results are seen early in the day. The leaf fragments should be kept away from the edge of the water to avoid grounding; they must not be so close to each other as to touch, else the phenomenon might be attributed to vegetable magnetism.

The gliding is abrupt, and so nearly instantaneous that the observer who fails to give the experiment his undivided attention is likely to miss the motion. The explanation is that there is an intermittent expulsion of a volatile oil from the broken cells. As this continues only for a short time the semblance to animation is as brief as surprising.

BESSIE L. PUTNAM.

THE CAMERA

CAMERA RECORDS OF BIRDS' NESTS.

[Also notes on the nesting habits of five of our ground breeding birds.]

BY P. G. HOWES, "MAPLEWOOD," STAMFORD, CONN.

I wish to emphasize the important part that the camera plays in the study of birds or any other natural history interests. The accompanying photographs show the good results and the high quality of the Eastman Kodak Company's cameras. With their cartridge Kodak No. 4 and Premo No. 4, I have marked success, and I highly recommend them to any prospective purchaser.

Our ground breeding birds are many, and to attempt describing the nesting habits of them all at one time would not only take up too much room in our valuable GUIDE, but would be practically impossible, as the ornithologist can not make an accurate study of more than four or five at a time. So I have picked out five birds which all nest on the



ARCHED NEST OF THE MEADOW LARK.
(Sturnella magna) in short grass in meadow.



NESTING PLACE OF FIELD AND HENSLOW SPARROWS.
In fields near by the spotted sandpiper may be found at home.

ground or very close to it, of whose nesting habits I will make a brief outline and of whose nests and eggs I have taken photographs.

To me there is nothing more enjoyable than to rise about 4 A. M., don my old clothes, shoulder my Eastman Kodak No. 4 or a Premo, sling on a fish creel in which to put my plates and collecting materials, and after hurriedly swallowing a few mouthfuls of breakfast, leave the house for a day's collecting. In my haste to get outdoors I slam the door behind me, half scaring a sleepy starling out of his wits, who has just emerged from his cosy box in a near-by pear tree, to welcome the new coming day with his odd and variegated but fascinating song. As I walk on across the lawn towards the meadows, sparkling in the faint light of the fading moon, with silvery dew, the first robin commences to sing his long, sweet carol, and his example is soon followed by his fellow friends. As I approach a nearby swamp a large male red-winged blackbird alights in the topmost branch of a smooth alder, and with a spread of wings and tail, utters his familiar "Oubeladee."

By this time the grey dawn is swiftly vanishing and a rich crimson glow in the east reminds me that I must not spend too much time thus idly listening to nothing and watching the weather conditions instead of my birds.

However it was on one of these trips in May, 1904, that I first found a nest of the spotted sandpiper *(Actitis macularia)*. It was placed among the long grass in a hay-field on our place (Maplewood Farm) and contained four eggs of a beautiful buff color spotted and splashed with blackish brown. The nests are composed of grass rounded into a shallow and frail nest. Birds like the spotted sandpiper whose young run about after the parent a few hours after hatching, need but a frail nest to keep the eggs from rolling about too much, while hatching. Compare the nest of this bird with that of the substantial mud structure of the robin whose young occupy the nest for many days.

The "teeters," as the sandpipers are commonly called by the country boy, on account of their habit of continually bob-



NEST AND EGGS OF FIELD SPARROW.
(Spizella pusilla.)

Built among tufts of growing orchard grass so that when the young are hatched they may have plenty of shade.

NEST OF THE HOODED WARBLER.
(Sylvania mitrata.)

A warbler showing flycatcher traits, often diving into the air after a passing insect.

bing their tail up and down, may be found around most any pond or swamp or coastal marsh. They nest through May and June, after which they wander about with their young. My migration



NEST OF SPOTTED SANDPIPER.
(Actitis Macularia)
Where nature has supplied pointed eggs which fit together so that the comparatively small bird may easily cover them.

THE NOOSE STRUCTURE OF THE HENSLOW SPARROW.
(Ammodramus Henslowü.)
Found on a "Red letter" day.

lists for the last few years, show that the time of their arrival in the spring is between the second and third weeks in April, they stay through May, June, July and August, departing for the South the second week in September.

My second subject is the meadowlark, *(sturnella magna)*. On some early March morning,—though the ground be still frozen and the air still wintry, you may hear the season of song inaugurated by the beautiful flute-like song of *"sturnella."* When I hear for the first time in the spring, I always forget the cold and the ice, and the thought of the coming spring, birds, and flowers at once enters my mind.

The meadowlarks arrive from the South the second week in March, but do not commence constructing their nest until the first or second week in May. They are exceedingly shy about building their nest, and even more so after the eggs are laid. The nest in the photograph is

of an exceedingly odd pair of birds, as they built their nest in the short grass of an old hayfield, with no protection whatsoever, while generally the nest is so concealed in long grass that it is quite difficult to find unless the bird is flushed. The eggs are from four to six in number, white, with reddish brown spots and lavender shell markings.

All through May, 1907, I searched a certain hayfield for two nests of this bird, but did not discover them until their young were hatched, and one over zealous youngster began to squawk as if he were being killed, when I happened to pass near to their home on June 15, 1907.

The Henslow's sparrow *(Ammodramus henslowii)* is a very rare migrant, and still rarer breeder in this locality. My first acquaintance with this bird was in May, 1907, while walking through a swampy meadow. I was walking along slowly when I heard a bird's note strange to my ear, and on closer examination found it to be no less than that of the Henslow sparrow. At the time I thought it only to be a passing migrant but later in the season I flushed a female

from a nest in a meadow near a swamp. This was on June 20, 1907. The nest was composed of dead grass, lined with finer grass. It was a very shallow affair, hardly more than an inch thick, with a depression in the center which scarcely kept the four eggs from rolling out. I have but two other records of this bird's nesting in this locality. These two nests were found by my brother, A. G. Howes, one on June 20, 1897, and the other on June 1, 1898. The eggs are white spotted with reddish brown.

Next on my list is the field sparrow *(Spizella pusilla)*. This little sparrow is always associated in my mind with useless fields covered with low bushes and weeds. Their shrill little song may be heard all through the heat of the day, and the hotter it is the better they seem to like it and the more they seem to sing.

The last bird on my list is the hooded warbler *(Sylvania mitrata)*. It is not exactly a common bird here, but may be occasionally found nesting in a thicket or on the ground under one. It was one day in June, 1907, while walking along near a thicket that I happened to see a small nest on the ground under a tangle of vines and bushes, on which was sitting a small warbler of some kind. The bird flushed before I could identify it, so I seated myself on the ground behind a nearby bush and patiently awaited the return of the bird. After a half an hour back came the warbler very cautiously, and I noticed with some surprise that it was a hooded warbler.

The nest was composed of leaves, grapevine bark and coarse grass, lined with much finer grass, and was placed in a clump of grass and moss squarely on the ground under the thicket. This is an unusual location for the nest, it being usually in a bush one or two feet above the ground and placed in a fork of the bush. The four white eggs are specked with reddish brown. After photographing the nest and eggs I returned home with a feeling of satisfaction at this new record. Later in the season I found one or two more nests of this bird.—*From field notes.*



BEAUTIFUL "MIRROR" PHOTOGRAPHY.

Made by F. H. L. Cotten, with Protar VIIa lens (The Bausch & Lomb Optical Co.)

DOMESTICATED NATURE

MY "HONEY" PETS.

Near the apiary is the pet house. My visitors are taken from one to the other. In the first, I explain that honey is a sour-sweet — formic acid supplies the sour and the grape sugar of the transformed nectar supplies the sweet. That is why I like honey. It gives the widest range all at once. Roses are better for the thorns on the stems. I grow sunflowers in the potato patch so that lovers of light and lovers of darkness may be contrasting companions.

Perhaps it is this love of opposites that induces me to keep "Nectar," the angel, in a cage, and next to it "Formic," the imp, in the pet house. Perhaps, in themselves, they are not in harmony; but to the visitor just coming from the apiary they are. Pain puncturing and taste tickling are there in partnership. And here in these two cages are the gentle and the ugly—the angelic and the d——— dweller of the lowlands. Scientists call him the Marsh hawk. The other pet from its sweetness and loving ways is rightly called "*home*-ing."

Sometimes Nectar and Formic go visiting—when I let them, or, perhaps more accurately stating, make them. I think that each has misunderstood the other. That was before I introduced them, and made them friendly. Now one of them knows that on such occasions there is nothing to fear. The other realizes that it isn't time for eating.

In the two I see a little world. Happiness with law and misery with anarchy.

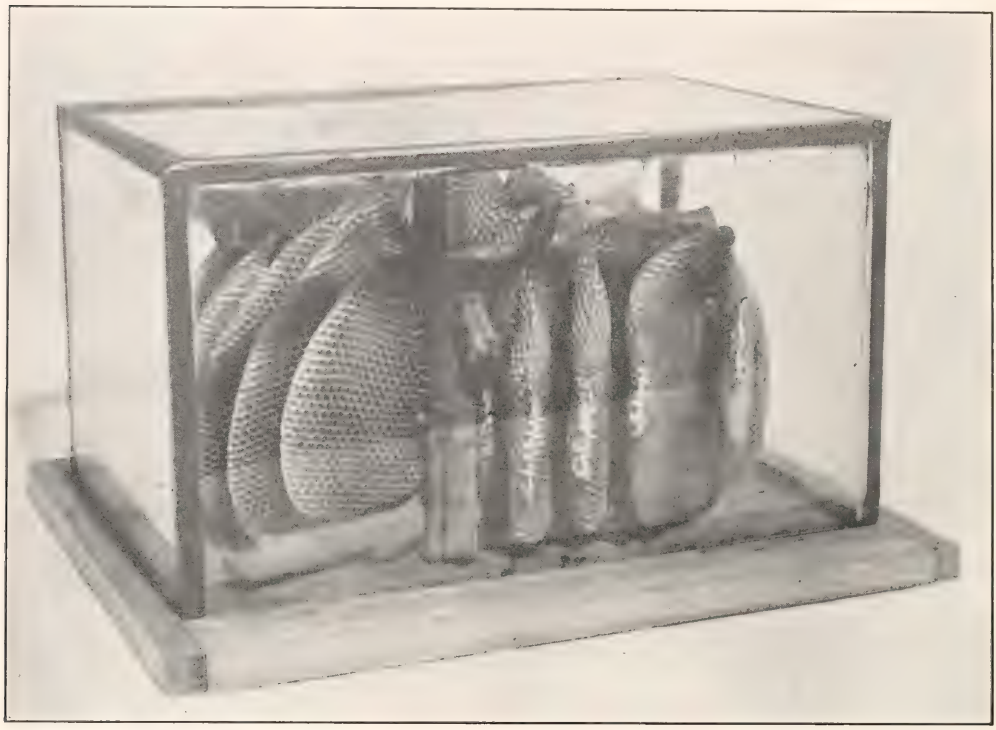


"NECTAR" AND "FORMIC."

A PASSE PARTOUT BEE-HIVE.

Though it has a Frenchy name, it did not come from France, but was designed, and constructed in a back yard in Yankeedom.

And the designing and constructing were not elaborate, though the results were effective and wonderfully interesting and instructive. You can do the whole thing as well as I, in just as simple a manner, and have just as much fun.



THE PASSE PARTOUT BEE-HIVE.
Bees removed to show comb attachment.

Recipe—Take five sheets of glass cut the right size to form a box; a few sticks; a small roll of passe partout binding; a board and a small colony of honey bees. Mix in the following manner: Fasten the five pieces of glass together at the edges, box-like, by a strip of passe partout binding on the inside of the box," and another on the outside. Cut a big hole in the center of the board or bore several small holes. Tack the sticks, as comb supports, above and around the opening. Do this in any fanciful manner that pleases you—and it will doubtless please the bees. They are not fussy in this respect. In fact the more rustic and heterogeneous the arrangement the better they seem to like it. Invert the box, which has no cover, open side downwards. And set the whole thing on an ordinary bottom board.

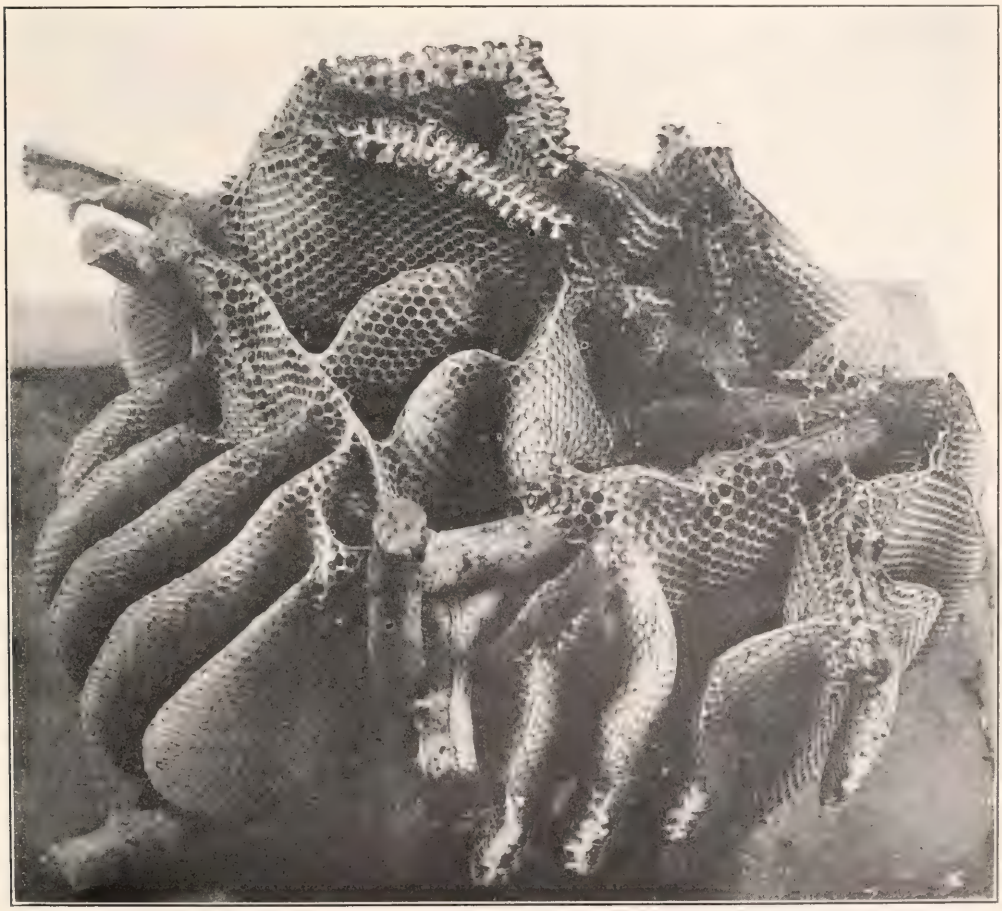
Either shake a queen and some of her following into this, or "swarm" into it on a bright day in May or June, in the usual manner—and "there you are." This is the whole process.

Now follows for weeks through top, sides and ends, the observation of the wonderful process going on within. If the hive is in the house with entrance through the side of the building, cover the hive with cloth or blankets for darkness and warmth. If the hive is out doors, add a piece of table oilcloth and fasten it down by a brick or a stone on each corner. I prefer to have the hive indoors, not alone because it is easier to protect it from moisture, but because it can there be easily watched by day and night, and Sundays, too!

Such a hive will give you new ideas of bees. Here they are not hampered by the regulation frame, nor forced to build comb in any particular manner. They can go up, down and on all sides, in every angle. And the manner in which they build in these angles and curves is astonishing. One is apt to forget that the bees' original home is in a hollow tree with absolute freedom to build in any manner. Comb is not naturally in the oblong straight form, as one learns to regard it by seeing nothing but regulation frames and sections. The bees left to themselves like to throw out a little projection here, a curve there, and "turn a corner" as they see fit. A close observation of methods and results of the individual cells in these projections and curves is very interesting. It is astonishing how the space is utilized even within the curve. I do not want to tell you all about it, for that would be to deprive you of a large part of the enjoyment. Try it and see for yourself, then report results. The cost would not be more than a dollar in addition to that of the bees.

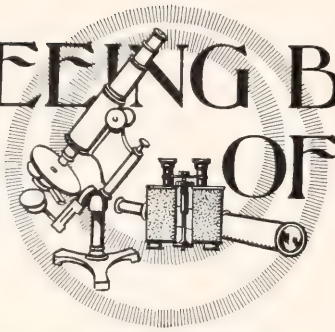
The photographs show the results in comb building in a hive that I tried last year. I have removed the bees to show the comb structure. (The bees may be easily removed by treating the whole as a super and setting it on another hive, with cover of this main hive off, and an "escape board" between the two.)

Last season's experience gave me many suggestions. I am trying it again this year. Will not the reader try it and report results?



INTRICATE AND BEAUTIFUL FORMATIONS OF HONEYCOMB BUILT IN THE PASSE PARTOUT HIVE.

SEEING BY AID OF THE LENS



WITH THE POCKET MAGNIFIER.

Some years ago Agassiz in the expression "Study Nature, not Books," pointed a way to a fuller appreciation of this old sphere upon which we live. But we have not followed the suggestion as closely as we should, and most of us know a very, very little about what is constantly going on around us in the animal and plant world.

It is true that most of the actors on the stage are too small to be seen without the aid of a lens, but this need not prevent us from enjoying the beauty and novelty of these small bits of life, for there are many excellent pocket magnifiers or hand lenses (such as those made by the Bausch & Lomb Optical Co., of Rochester, N. Y.) which are within the reach of all.



(The Hastings Triplet, one of the best magnifiers. Price $7.50)

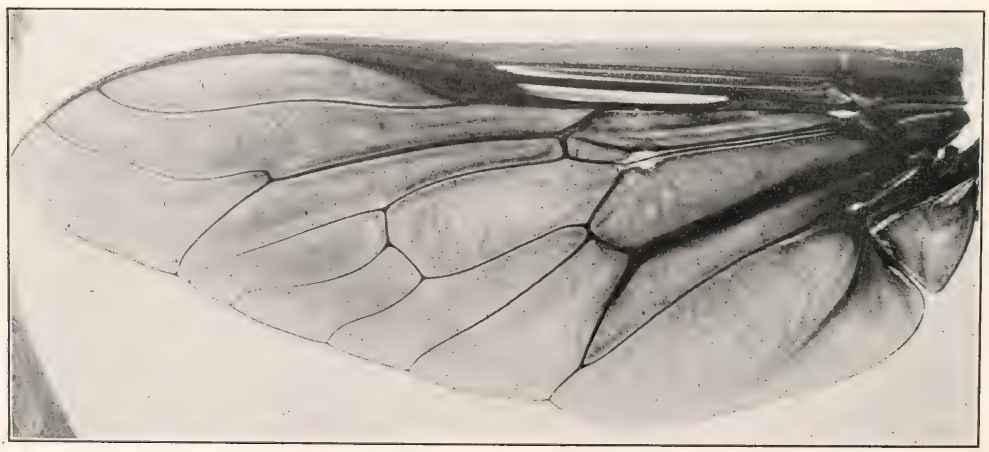
But, you may ask, what is to be seen? Simply multitudes! With a pocket magnifier as an out-of-door companion every stagnant pool, every decaying piece of wood becomes full of interest, and our walks cannot lead us into paths that are devoid of scenes worthy of our attention. Every stone in the woodland, when turned over, opens a door into a new and different land where the many legged inhabitants go scurrying to and fro performing their part in the division of labor just as individuals in a well organized community of men do. Indeed many examples of activity and the strenuous life may be found which are well worth following! One becomes absorbed in the study of sensitive antennæ, the absurdly formed mouth parts, the hard, pro-



(The Triple Aplanat, a fine lens. Price $3 50)



(The Doublet. Price 75c.)



HORSEFLY'S WING AS SEEN BY AID OF A POCKET MAGNIFIER.



WING OF GRASSHOPPER. HOUSEFLY.

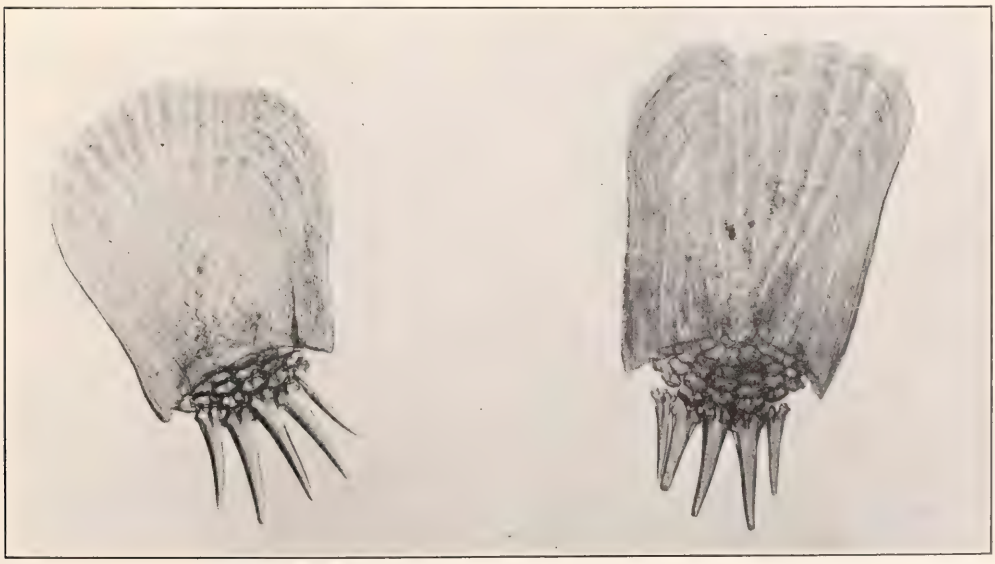
tective shells and wondering why they are so until care and troubles are forgotten and the full benefit of being out of doors realized.

And there is still another advantage, which is that observations can be made within the natural habitat of our small friends so that we may learn to always distinguish them from our enemies. And there are many of the latter which we should learn to know in all stages of their life cycles, so that wherever met they may be exterminated. For example, there is the gypsy moth, now such an imminent danger in New England.

In the plant kingdom many wonders await us and progressing with the study adds fascination to our walks in the fields and woods. The means by which seeds are distributed, the provision for plant protection, growing roots, bark, exquisite mosses, wonderful spores and



(Pocket Magnifiers in Vulcanite mountings; come in various styles. Prices 20c. up)



FISH SCALES WITH MODERATE MAGNIFICATION.
Show "prongs" for attachment and grooves for lubricating fluid.

plant parasites—all are realms which any one with a pocket magnifier may invade with profit. The magnifier does away with the trouble of taking parts of the object under study to one's home and allows the observation to be made where the material is natural and growing.

"Seeing by aid of the lens"—the pocket magnifier — broadens one's view of things, makes the world more enjoyable and gives us some insight into the marvelous structure of the universe. The agriculturist, the horticulturist the geologists, other scientists and nature students have long appreciated the pocket magnifier for its faithful service. We who go abroad in fields and wood for recreation, pleasure and health should become better acquainted with these wonder-working lenses. They add both profit and pleasure at all seasons of the year.

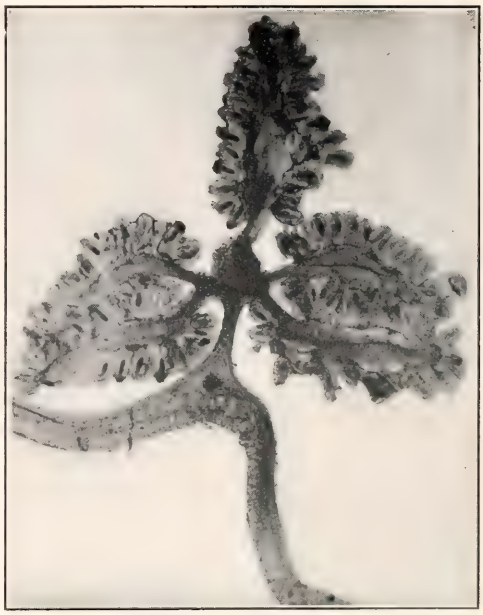
PLANT OVARIES AND OVULES AS A BOTANICAL STUDY.

Any natural science may be made a pleasing, instructive and beneficial recreation. To accomplish such commendable purposes it is not necessary for the student to make himself a professional investigator, and pursue the study of any particular department in order to teach it to others, nor as a means by which to gain a livelihood. As an amateur he may not only inform himself, but may prolong his life, increase his happiness, and cultivate his æsthetic tastes by devoting his leisure time to the study of some department of nature, toward which he may feel an inclination, toward which his reading may direct, or observation lead him to follow a friend's example. Of all the natural sciences, botany perhaps combines more real satisfaction with mental and physical recreation, than any other. The pleasure of finding a flower new to the student is a delightful experience. The exhilaration of the open air, of the companionship with the humble favorites of nature, the physical exercise, the sensation of freedom, and especially the mental rest obtainable from a new train of thought, and relief from other and perhaps not entirely congenial work for daily bread, together give the student a longer lease of life and a firmer hold on the spiritualities of existence.

The human being of any number of years may be felicitated if he have a natural liking for botany, as most persons find that they have when, perhaps by accident or by a casual remark of an



No. 1. OVARY OF NIGHT-BLOOMING CEREUS.

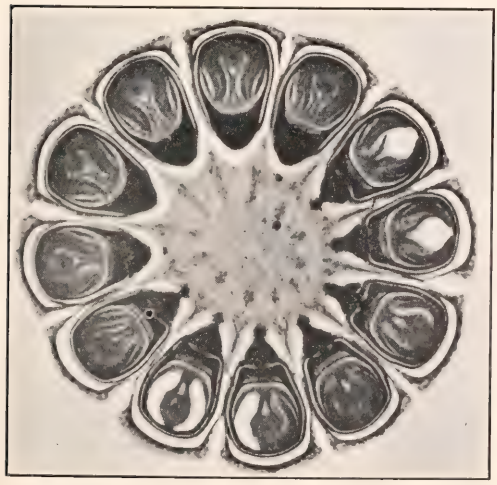


No. 2. OVARA OF BEGONIA

acquaintance, they are introduced to it. And if the student discovers that he likes to use a microscope, even one with only low magnifying powers, he may congratulate himself, for he has then entered on a field of amateur investigation to occupy his evenings and his leisure time, that can never pall, nor tire, but will always be ready to show him some new, interesting and instructive thing. "Man cannot live by bread alone," is a divine precept that man has proved by experience. Bodily and mental recuperation are rarely obtained by a mind that is blank.

The pleasure of identifying, or "analysing" the flower is to be added to the delight of seeing, with the microscope, structure or objects invisible to the naked eye. If the reader has not had that experience there is something agreeable in store for him.

Perhaps one of the most interesting features, possibly the one most neglected by the amateur, is the examination of sections of the plant ovary, the contained ovules, and the placenta to which the ovules are attached. These all vary widely in number, structure and appearance in different flowers, and all are well worthy of study and of record. In a paper like this it is not possible to do more than to hint and suggest. Further investigation must be left to the student, who may enter the field certain that he will be rewarded.



No. 3. OVARY OF COMMON LOW MALLOW.



No. 4. OVARY OF EUPHORBIA (A SPURGE).

The few illustrations here shown are transverse sections of the ovaries of plants not rare nor difficult to obtain, and are not highly magnified. They are used more to show the variety and the general aspect of such objects, than for any other purpose. The reader is of course not limited to these; the nearest field is full of flowers as instructive and praiseworthy as are those here pictured. All that he needs is a fairly good supply of patience and perseverance, a sharp knife or razor, and a microscope with a good, low-power objective. Any book on botany will inform and help on the subject, which he has certainly neglected or overlooked.

Photo 1 is a section of the ovary of the magnificent Night-blooming Cereus, *(Cereus Grandiflorus)*, which is "one-celled with parietal placentæ." The preparation was too strenuously handled before it was "mounted," or too carelessly, and only eight ovules remain attached to the sections of what the technical description calls the parietal placentæ.

The ovary of the *Begonia* (Photo 2) is three-angled with the placentæ in the angles. This illustration is also rather

imperfect. The wall of the ovary has been removed, probably by the rough handling of the person who prepared the section for the microscope, but enough remains to show several interesting characteristics.

Photo 3 is the ovary of *Malva rotundifolia,* a plant that produced the "cheeses" of our childhood, which the reader, and the writer, too, has many a time devoured with mucilaginous delight. The flattened fruit or "cheese," shown in transverse section by the illustration, here contains twelve cells, each with an ovule, but as the slice is not quite flat (the fault of the operator), the ovules have been cut across at slightly different levels.

LITERARY AND BIOGRAPHICAL

How to Lay Out Suburban Home Grounds: By Herbert J. Kellaway, Landscape Architect. New York: John Wiley & Sons.

This is a book more of inspiration than of doing. It tends to give right ideas, rather than to lay down rules of definite methods. It gives the suburbanite the "key" to the situation and then he can unlock his particular problem. The following quotation expresses the plan of gradually accomplishing the results desired:

"Can the ideal be attained? Yes; perhaps not all at once, but little by little as funds permit: The scheme must be outlined and a determined and settled purpose will accomplish what was seemingly the unattainable. The house is usually the first thought. Instead the beginning should be on the ground, the location, quality, surroundings, and possibilities for development. The adaptability of the site to secure the ideals of the home builder should be considered, whether it is a shrub embordered lawn, a flower garden, or natural or wild grounds. It is possible to create effects on almost any site, but every natural feature should be utilized. A home well begun is half done. Consideration should be given, besides the cost, to the 'upkeep' or maintenance. The cheapest method of development and least cost for care is to have mostly lawn and shrubbery. The more details planned, such as arbors, terraces, and gardens, the greater will be the expense for keeping them in order."

The book is well printed and beautifully illustrated.

The Open Road: A Little Book for Wayfarers, compiled by E. V. Lucas. New York: Henry Holt & Co. 16mo. 1907. Pp. XII., 326.

However unwilling one may be to admit it, the fact remains that personal appearance has a greater influence than almost any other quality apparent at a first meeting. Shirt sleeves, unkempt hair and broken shoes never yet changed a stranger into a friend. It is no less true of the external aspect of a book. A frequent visitor at the public library, or an attendant there, will not rarely see a volume rejected with the remark: "I don't want that. I don't like the print; it doesn't look comfortable." Similar criticism cannot be made against this little book, for it is alluring from start to finish. The artistic "end papers" impress the observer favorably, for he opens the cover to look at the open road winding across the landscape toward the sunrise, and he closes it with a vision remaining of the footpath way, and fallen leaves rustling beside the road beneath the crescent moon.

After a gentle farewell to the winter and the town, the anthologist leads us to the open road, with Titania for a companion, while a lover is singing in the distance. "The Little book," as the compiler says, "aims at nothing but providing companionship on the road for the city-dwellers who make holiday. It is just a garland of good or enkindling poetry and

prose fitted to urge folk into the open air, and once there to keep them glad they came." We wander below the sun and the cloud, and beside the windy hills, involuntarily, with the change of a single word, repeating the boy's prayer:—

God who created me
Nimble and light of limb,
In three elements free,
To run, to ride, to swim:
Not when the sense is dim,
But now from the heart of joy,
I would remember him:
Take the thanks of a boy.

In the garden and the orchard there are music and laughter beneath the branches. We meet a little company of good country people, and return with reluctant feet to the noisy town, refreshed by the ramble and made glad by the remembrance of our experiences.

Among poems that we are all supposed to know and to admire, one of the most pleasing and suggestive is by the anthologist himself. He calls it "Jack."

Every village has its Jack, but no village ever had quite so fine a Jack as ours:—

So picturesque,
Versatile,
Irresponsible,
Powerful,
Hedonistic,
And lovable a Jack as ours.

How Jack lived none knew, for he rarely did any work.

True, he set night-lines for eels, and invariably caught one.

Often two,
Sometimes three;

While very occasionally he had a day's harvesting or hay-making.

Jack had a big black beard, and a red shirt, which was made for another,
And no waistcoat.
His boots were somebody else's;
He wore the Doctor's coat,
And the Vicar's trousers.

Personally, I gave him a hat, but it was too small. . . .

Then there came a tempter, with tales of easily acquired wealth, and Jack went away in his company.

He has never come back.

And now the village is like a man who has lost an eye. . . .

For my part, I have hope; and the trousers I discarded last week will not be given away just yet.

The reviewer has so thoroughly enjoyed the little book, that he must be allowed the satisfaction of complaining about something. The paginating should have been in the proper place at the top, not as it is, at the bottom, where it is as irritating as a briar of the wild rose in the thumb.

A. C. S.

The AGASSIZ ASSOCIATION

SUCCESS IN STUDYING BOTANY.

BY DOROTHY A. BALDWIN, WELLESLEY
NO. 2030.

This winter I have been taking a very interesting course in botany. It is different from the courses taught in most schools and colleges, and it seems to me to be just the kind of a course the AA would approve of. We have no text-book whatever, and although for the greater part of the year we are assigned our work for certain days, we are left to do the studying and the thinking out of the difficult points for ourselves. Then we are sometimes assigned the study of some phase of plant life and are allowed a certain number of weeks to make the study purely from observation. For instance, during the winter, germination was studied in this way and this spring the opening of buds and cross pollination.

In this way we have gained much more

than we ever could have by the use of text-books, and it has interested us to go on with the studies we have begun.

I think the way to study nature is to observe first and then use books afterwards, if necessary to make sure you are right. But if you meet a difficulty don't give up after the first attempt to solve it. Keep at it, observe carefully again and again, and take your observation from as many different specimens as you can. That is the way to get real benefit and pleasure out of "nature study" as a study.

* * * * * *

I wonder if it wouldn't be a good idea for some of the Chapters to let their members each choose some particular point in nature study to work on while they are doing general work. I suppose this would have to be as each Chapter decided, though, and perhaps some have already tried it. It seems to me that when there is such an enormous field to work in you are apt to get lost, as it were, while if each chose some particular thing in which he was very much interested to study it would give something on which to start.

THE CARNEGIE INSTITUTE.

During the first two days in April, Chapter 1011, Johnstown, Pa., of the Agassiz Association, had a short but interesting trip to the Carnegie Institute of Pittsburg.

Here the Chapter was greatly interested in the different minerals, animals, birds, fish, and miscellaneous curios from all parts of the world. Among the curios the Indian (North American) collection showed the manner of living and dress. The animals and birds are very well mounted, one case being worthy of special mention. It was a setter pointing a flock of quail, the quail being so arranged among the autumn leaves that it took some sharp looking to see them. Among the animals the skeleton of the famed *Diplodocus* was the most interesting. A visit to the mounting rooms showed the Chapter two gorillas being mounted and a few large live rattlesnakes making a great commotion.

SAINT GABRIEL'S CHAPTER, NO 1013.

Our most recent and a promising chapter was organized at St. Gabriel's School, Peekskill, N. Y. There are thirty-nine members. The officers are: President, Dorothy Kent; Vice-President, E. Primrose Lawrence; Secretary, Margaret Brett.

REPORT.

The changing of our Out-of-Doors Club into a branch of the Agassiz Association has caused much interest. We are divided into two parts, the younger children forming a Junior Branch. They are very enthusiastic and at present are busy with an aquarium, an account of which they hope to send in for your competition.

Our branch is composed of several committees; for birds, for trees, for wild flowers, for insects and for stars, respectively. As a great many of us are beginners, some of the committees have not accomplished as much work as others. The bird committee can make the best report. Seventy-six different kinds of birds have been seen since the first of January, and the dates of the arrival of migratory birds have been kept.

During this last month great quantities of birds have been seen. One of our members identified twenty different kinds in one afternoon, and another, to whom the work is quite new, has a list of thirty-seven that she has seen this spring.

We do not intend the bird work to stop with the close of school. Two of our branch expect to be abroad, one on a driving trip through Norway, and another along the Mediterranean coast. Each is going to keep an account of the various birds she sees. Then several intend to make trips to the Natural History Museum in New York, and all have been requested to make observations around their homes.

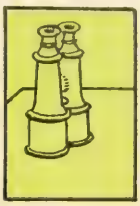
Next fall we hope to have all our work recorded in a catalogue. We are also anxious to take up the observation of the habits of birds, nesting, etc., as our work so far has been chiefly identification.

I will leave the reports of the other committees until we have done more work with them.

E. Primrose Lawrence.









THE GUIDE TO NATURE

Stamford, Conn.
Edward F. Bigelow, Editor.

Vol. I JULY, 1908 No. 4

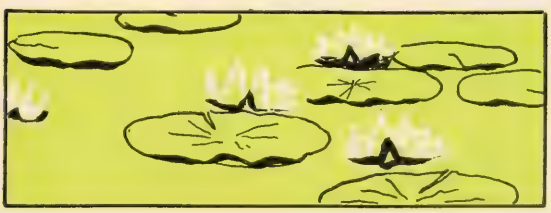














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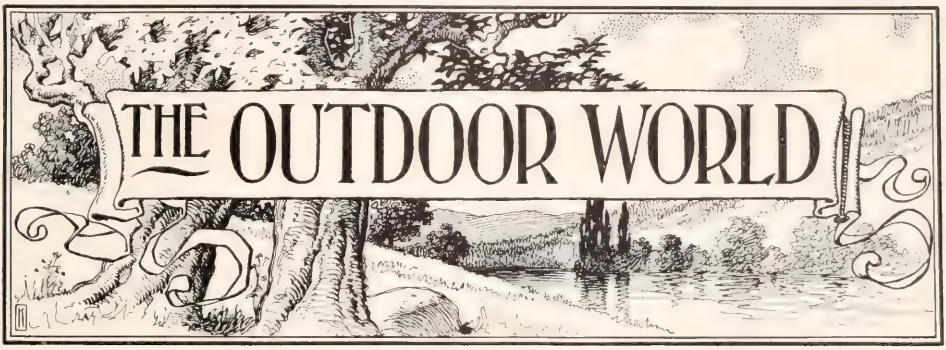
AGAIN I SCENT THE WHITE LILY, AND A SEASON I HAD WAITED FOR HAS ARRIVED. HOW INDISPENSABLE ALL THESE EXPERIENCES TO MAKE UP THE SUMMER.—Henry David Thoreau.

My heart is fixed firm and stable in the belief that ultimately the sunshine and the summer, the flowers and the azure sky, shall become, as it were, interwoven into man's existence. He shall take from all their beauty and enjoy their glory. - RICHARD JEFFERIES.

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I JULY, 1908 No. 4



La Jolla, the Nature Lover's Beach

BY CHARLOTTE M. HOAK, LOS ANGELES, CALIFORNIA

"Lest we forget that out of wild nature we are come; that our instincts are great, our wisdoms little, that the main current of our will is still like the green moving waters, and our reasoned choices like the flutter of foam on its surface; that we became citizens but yesterday and were bred in the wilderness."

LA JOLLA is the nature lover's beach. When the wheezy little motor that has tugged you up goes clanking on its backward track to San Diego, the rhythmic beat of the incessantly pounding surf, like an impenetrable curtain of sound, shuts out the outer world. Its hurry and bustle, its strident noises and nerve wearing discords are one by one forgotten once you yield yourselves to the charm of the sea.

A set description of La Jolla is not necessary, for her fame has already gone abroad. Every well informed tourist comes with large expectations of this "gem of the sea," and none are disappointed. Not far from the stuffy little station, which never yet has held one-half the eager crowd which throngs thither, lies the main part of the village, a cliff colony charmingly set on the brown sandstone bluffs where they slope less abruptly to the water's edge.

Before you have been many days in La Jolla, you yield to the charm of the mysterious caves which are accounted her chief attraction. At high tide the sounding surf breaks angrily far inside their gloomy entrances. The constant

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boom of gigantic breakers beats and wastes a useless strength on the impregnable walls of stone. The foam of this endless strife breaks hundreds of feet into the air and the restless waters surge back again to gather strength for a new attack. The nearest cave, a mammoth vault forty feet high and two hundred feet long, may always be reached by a tunnel which has been excavated from the land side. Its entrance is in the hands of a proprietor, and if your sense of curiosity is more than your spirit of daring you may enter by this more conventional way.



"A CLIFF COLONY CHARMINGLY SET ON THE BROWN SANDSTONE BLUFFS."

But the "white lady of La Jolla?" All sorts of vague accounts you hear of this phantom lady of the sea. At extreme low tide you make your way along the slippery cliffs over an uncertain pathway piled high with seaweed wreckage. Now and then you slide into an eddying pool. At length you reach the mouth of the first cave. Threading in and out among the rocky halls you come at last to a cave more spacious than the rest. You turn your eyes seaward and there in the mouth of this cave, filling its entrance, stands the mystic white lady. Her radiant form is clothed in garments of light. She stands expectant, listening, her bridal veil sweeping from her queenly head envelops her tall form and trails its shimmering folds down to the water's edge. The older settlers aver that this strange, life-like form sculptured from the rocks which form the mouth of this cave is the likeness of an unfortunate bride who in early days was overtaken by the treacherous tides while she was exploring the interior of the cave.

At every step La Jolla's surf line is made up of entirely different features.

Beneath the Natural Bridge lies the roadway to Rocky Point. Here a series of shelf-like benches have been worn by the action of the waves. The honeycombed surfaces of the upper levels are riddled through and through with the deserted dwelling places of innumerable colonies of mollusks that have lost out in the ceaseless struggle for existence. On the lower benches, just below the surface of the water, lie the "marine gardens." From the vantage point of a huge boulder you may sit and sun yourself and study these matchless gardens of the sea. Marvels of glowing color and moving grace, their sinuous, undulating folds rise and fall with each movement of the waves, like trees blown by vagrant breezes. A garden without



"WAIT TILL THE NEXT WAVE COMES IN."

blossoms, yet simulating all the gorgeous coloring of our showiest flowers; destitute of foliage, yet possessing the delicate tracery of our finest ferns. Fishes green and gold dart hither and thither in this natural aquarium, threading their devious ways through the waving branches. Starfishes gleam out like seastars from the shadowy recesses of hiding rocks, and here and there gorgeous sea anemones bespangle the rocky depths which serve as an anchorage for this strange garden.

On windy days when the white capped waves run high one may watch with spellbound fascination the boiling surf at The Witches' Caldron. The mad waters seethe in and out, their heedless fury lures you nearer until a huge breaker lunging shoreward catches you unawares



GROUP OF TORREY PINES OVERLOOKING THE OCEAN.

and you go home drenched through and through by a salty shower.

The monotony of a dull day hung low with gray fogs tempts you inside to explore that wonderful marine laboratory on Alligator's Head where the specimens are preserved alive. In the numerous tanks and jars filled with sea water you find a complete collection of the sea life, rare and common, of the whole southwestern shore; and at closer range you may observe the rarer and shyer specimens that eluded you in their native habitat. You may watch a tiny shark emerging from his queer ungainly spiral shell, wonder at the sea anemones curling their daintily tinted fingers voraciously around whatever prey you may offer them and laugh at the starfishes wriggling into humpy and ungainly stars.



THE CAVES WITH DEEP MARINE GARDENS AT ONE SIDE.

On the days when the lure of the sea is less compelling, you turn your face landward to the open sunny mesas that lie beyond Mount Soledad. The most traveled road across this sea of sagebrush and low desert herbage is the road to the Torrey pines. In this rugged and picturesque natural park lie scattered in groups or singly some two or three hundred trees of all sizes and ages. They present a most interesting commentary on the strenuous struggle for existence. On the seaward side they form dense mats which creep and crawl persistently up the rocky washes until they reach the crest of the mesa. On the sides of sheltered ravines slightly protected from the remorseless buffeting of wind and weather they assume their characteristic form—sturdy, clean and upright.

Scientists from all parts of the world have visited this remarkable grove and many a conjecture has been offered as to their probable origin, but these noncommittal pines guard well their mysterious secret. This is the only locality in the world where they occur. They were named shortly after their discovery in 1850 in honor of our famous naturalist, Professor John Torrey.

If you are a fearless driver you may guide your horse down the steep grade which pitches abruptly from the Point of Pines. At the foot of this hill you may enter again the new automobile boulevard which extends from San Diego to Del Mar, or you may drop down lower still, if the tide is going out, to the natural boulevard which follows the changing line of advancing and retreating waves for over ten miles. Your gaze turns ever seaward away from the monotony of the high, brown, seamed cliffs whose soft surfaces are worn into fantastic shapes by the turbulent erosions

of winter rains. An unbroken sweep of breakers lines up, disperses and lines up again. Sea gulls wing their strong flight overhead; shy sandpipers and sanderlings flit before you; tangled masses of seaweed and kelp throw up temporary barriers forcing you to pursue a devious route. A dazzling sweep of moving waters, the blue glory of the summer sky, the shimmering stretches of wet sand, the ceaseless music of the surf, the clear, plaintive call of the wild sea birds—these are your lasting impressions of that wonderful drive from The Point of Pines to Del Mar and back again. The words wherewith you are wont to describe what you see fail you in the presence of the illimitable beauty of this care free solitude of sky and sea.



"THE WHITE LADY."

'There in the mouth of this cave, filling the entire entrance, stands the mystic white lady."

MOVEMENT FOR SCHOOL GARDENS GROWING.

The movement for school gardens in the large cities is growing so rapidly in all parts of the country, according to the officers of the International Children's School Farm League, that there is a dearth of trained teachers to take charge of the work in many cities which are ready to establish such gardens. To supply instructors for children's gardens, the League has lent its encouragement to a special course on school gardens to be given during the coming summer at the New York University Summer School on University Heights. The course, which will be under the direction of Henry Griscom Parsons, will be particularly designed to train teachers in "the methods of preparing and conducting gardens for the education of children." The large Schwab garden at the University will be used for field work, and a building nearby devoted to an indoor laboratory where the phenomena of plants, soils and insects in their relationship to horticulture and general natural science can be studied.

The method of instruction, according to Mr. Parsons, will be strictly practical. Each student will be expected to prepare and care for a typical garden plot such as the child would have. The class as a whole will cultivate the observation plots showing typical weeds, or grains or other staple products which are not raised by the children in their own plots. Moreover, the teachers will be shown how to make all of the apparatus which they will use in their simple experiments. The class will also be given observation



UNIVERSITY SCHOOL GARDENS.

work in the three large children's gardens which are within easy reach of the University, where they will have an opportunity to see from 300 to 500 little folks actively at work.

AID NATURE STUDY TEACHERS.

The laboratory work and study of insects and soil will, it is believed, aid the teacher of nature study materially by showing her how to teach these subjects in a practical way leading to practical results rather than through abstract lessons which the child has no way of putting into practice. For the real object of a children's garden is not only to give the little workers outdoor exercise and to enable them to raise eatable vegetables or fine flowers, but it is also to give them



THE OUT-OF-DOORS CLASS ROOM.
Any one could study under these conditions.



A CONSIDERATION OF INSECTS AND WEEDS.

the educational benefit from living with nature's processes. The teacher who only shows children how to make things grow, fails, according to Mr. Parsons, to reap the largest benefit from her work. Teachers who avail themselves of such a course as is offered will hold the interest of their pupils by being able to show them many of the reasons why things grow, why certain insects are necessary and others hurtful to plant life, and to show the real meaning of soil, rain, sunlight, water, temperature, not merely to plant life, but to themselves. Mr. Parsons believes that a few simple experiments with plants can be made



PREPARING SPECIAL APPARATUS IN THE WORKSHOP.

most effective lessons in teaching the children the importance of ventilation and sunlight to themselves.

The school gardens can also be used as a means of teaching a respect for manual labor, an appreciation of the value of different economic plants and of the work of raising them and preparing them for the consumer. To the city child the school garden frequently gives the only point of contact with the country, and, in certain cases, stimulates a desire to leave the crowded cities. While no claim is made of teaching agriculture in the larger sense, it is surprising what an amount of elementary agriculture and elementary forestry can be taught in these gardens for children.

However, it has been found that the elementary knowledge which can be acquired is sufficient to start the prospective farmer on the right track and to give him a habit of getting at the reasons for things. An instance of this happened to Mr. Parsons while conducting the Children's School Farm at the Jamestown Exposition. Many farmers came to listen to the lectures for the children. In one case, Mr. Parsons talked about the tomato worm, which is the cordially hated tobacco worm of North and South. The farmers had simply been crushing these worms, thereby killing, at the same time, the parasites on the worm which eventually destroy the worm. He showed them that if they collected but did not kill the worms, and allowed the beneficial parasite to live and breed others of its kind, they would make war on other tobacco worms. The farmers had not thought of this, and were intensely interested because they could see the reason for it. Children who have had this preliminary training approach agriculture with more of a scientific attitude and are more likely to avoid haphazard farming. Mr. Parsons hopes in his course to gain teachers who can implant this germ of science, and yet, at the same time, be entirely competent to take over the practical management of a garden in a school yard or on a vacant city block.

During seven years' experience the garden work has proved a most valuable means of teaching English and an ideal method of manual training. For physical culture it has yet to find its equal, judged by the results in health, strength and quickened intellect in both child and teacher. Without the boisterous romping, every side of the child's nature is brought into joyous activity and splendid development.



THE DELICIOUS PHYSALIS.

When it first became delicious to me, I did not know it by so scientific a title as *Physalis,* but by the common name strawberry-tomato. I had also heard it called the husk tomato and that appealed to me in those boyish days, because I imagined that the fruit needed to be husked like corn.

In later years I heard it called ground cherry, but that always seemed a misnomer, for it does not appear to be cherry-like and it does not grow on the ground.

For many years I did not see it. But I frequently descanted upon its flavor. When I was asked why do not we have it nowadays, I could not answer, but at once determined to get it. So for a few years past a part of my garden has been devoted to these tomatoes. They are the simplest of all things to raise, because after the first year they raise themselves. The seeds live in the ground



THE PHYSALIS IN THEIR HUSKS.

during the winter, and no weed comes up more luxuriantly or persistently.

The calyx is interesting in the manner in which it separates from the green pulp of the husk and becomes like fine lace. This is especially true of the fruit on the lower parts of the plant where the calyx is damp, and more generally true of those falling on the ground.

There are several varieties in cultivation, nearly all good to eat, cooked or not. Physalis is a member of the nightshade family, and is closely related to the eggplant, tomato and white potato. There is a variety in the west known as garden huckleberry *(Solanum nigrum)* and used for making pies, but not fit to eat in the raw state. Several horticulturists of whom I have inquired can give no specific information as to attempts at improving Physalis. Professor L. H. Bailey writes:

"I do not know of any very definite experiments to improve the Physalis. For a number of years I grew the species here and once wrote a bulletin report on them. This report, however, was more for the purpose of bringing our



THE GROUND CHERRIES, IN THE DISH, REMOVED FROM THEIR HUSKS.

knowledge up to date than to make experiments in improvement. I have seen a number of interesting forms on the grounds of Luther Burbank in California and I know that he has been working on them more or less. I do not think, however, that he has made much out of



A SECTION OF THE PLANT SHOWING FRUIT IN GROWTH.

it yet. I think that there is a good deal to be accomplished in the mere introduction of good forms from Mexico and other places."

THE GUIDE TO NATURE will be glad to learn of any attempts at improvement or of extensive cultivation for the market. It is strange that a fruit almost universally liked, so easily grown, and so abundant on the stems should be so rarely seen. Strange, too, that I should have said so much of its good qualities and yet waited so many years before raising it. Perhaps you, too, have been unconsciously emulating that example. If so, now turn about and help me to cultivate and to investigate.

NATURE IN THE GARDEN.

BY A. W. NOLAN, A. B., PROFESSOR OF HORTICULTURE IN WEST VIRGINIA UNIVERSITY.

A few days ago I was transplanting a row of wild sumac, along the back of my garden on a city lot. The farmer who was plowing the garden at the same time stopped his team before the young, bare sumac stems and said in disgusted astonishment:

"I don't see what you want to plant those ugly things here for." I tried to explain to him that their leaves were graceful and beautiful, that their seed cluster gave a pleasing effect in autumn, and that the abundant massing of the shrub made a fine background to the garden. But the farmer whipped up his horses, started his plow and grunted: "Umph, you can find that stuff anywhere; looks too much like the woods for me."

Here lies a great barrenness in adult lives—a dwarfed appreciation of the truths and beauties of commonplace nature. We adults fail to see nature in our own gardens. We are too sordid to realize the possibilities of inviting nature into our own dooryard. We grow prematurely old, because we fail to catch the spirit of the sunrise, of the sprouting grain and of the pipping shells.

There is no reason, except ignorance and idleness, why we should not make our home grounds beautiful with the shade of trees, fragrant with flowers, luxuriant with fruit and vegetables, and cheerful with songs of birds. Wherever there are soil and sunshine, plants will grow; wherever there are plants, birds will come, and wherever there are plants and animals, men, women and children should be happy. One great secret of happiness is to live in harmony with one's surroundings, especially with one's natural surroundings. With every tree, shrub, grass-blade and flower, with every bird,

beast and bee, with every breeze, cloud and sky, one should have an intelligent, sympathetic relationship.

The two greatest sources of pleasure in life, perhaps, are the creation of something good and the appreciation of what has been created. Both of these pleasures are open to us all, even within the gates of our own garden. We may here gladly co-operate with nature in the creation of new and beautiful life, and we may here gladden our lives by the appreciation of nature's creation.

POPULAR ASTRONOMY

AN INEXPENSIVE HOME-MADE TELESCOPE.

BY LATIMER J. WILSON, 828 DAWSON ST., NEW YORK.

Can you imagine a telescope made of clothes hooks, stretcher sticks, paper mailing tubes, paper boxes, canvas strips and parts of an old bedstead? The photograph, which illustrates this article, will help your imagination, for it shows a telescope made of just such commonplace material. With a few inexpensive lenses and a little ingenuity, the old paper boxes that are hiding in a corner of the attic, and the other odds and ends about the house can be pressed into service, with a result that is sure to be a delightful surprise.

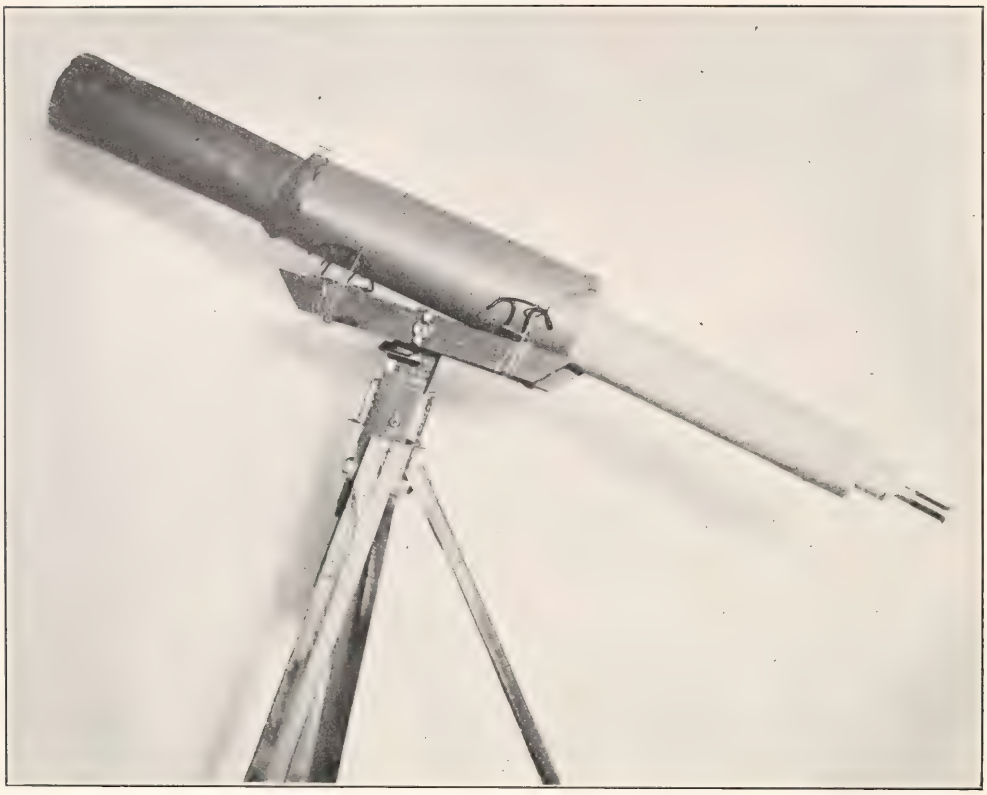
For one or two dollars can be purchased, an ordinary double convex lens, three or four inches in diameter, and having a focus of about forty-eight inches; this will do for the object glass. A meniscus lens would be better, but would cost a little more. An achromatic lens would certainly be most satisfactory, but a more suitable mounting would be preferred to that described here; and this is to be a telescope which anyone can make.

We will begin with the large tube, which can be made from the paper boxes if they are the required length. The paper should be about one-eighth of an inch thick and should be rolled to make a cylinder of double thickness which will be five inches shorter than the focal length of the lens, and with an outside diameter exactly the same as the diameter of the lens. To make the tube perfectly round, it can be shaped on a solid form while the two thicknesses of paper are glued together, and securely tied until the glue is dry. The solid form is easily made by rolling newspapers tightly around a curtain pole until the desired size is obtained. Both ends of the tube should be cut perfectly true.

We will now cut a strip from the paper box, six inches wide and long enough to make a cylinder of double thickness, which will fit around the outside of the tube. This cylinder should be glued firmly to the tube, being allowed to project two inches over the end upon which the lens will rest, thus making a cap to hold the lens. A flat metal strip can be pressed against the lens to hold it firmly in place. Fig. 1.

In the opposite end of the tube, we shall fix a paper mailing tube, about two inches outside diameter and twelve inches long. Glue heavy paper around this, until it fits tightly into the large tube and is exactly centered. Fig. 2. It should be entirely within the end of the large tube and immovable. Another tube, fourteen inches long, can be arranged to fit into the two inch tube and will be used for focusing. It can be made to slide easily in and out, by pasting sheets of smooth letter paper around it.

For the eyepiece, two plano convex lenses should be obtained, one having a



THE HOMEMADE TELESCOPE.

focus of one and one-half inches and one inch in diameter; the other with a force of half an inch and half an inch in diameter. Get a tube about one and one-half inches long which fits into the focusing tube and glue thick strips of paper in each end, in such a way that the lenses will be exactly collimated. They should have the plane sides toward the eye and the small lens should be nearer the eye. Place them one inch apart, arranging a diaphragm as shown in (A) Fig. 3. This is a Huyghenian eyepiece and can be purchased, already made, for about one dollar and a half. It is well to have several eyepieces of different power; the one described will magnify sixty-four diameters if the object glass of the telescope is forty-eight inches.

Strips of canvas should be glued on the whole of the large tube and over the cap, bending down the ends and gluing them for about one inch inside the cap. A coat of paint can be applied; the inside of all the tubes should be painted a dead black. A tin bucket top, the proper size, makes a satisfactory covering for the lens cap when the telescope is not in use.

In making the stand we should select the strongest material that can be found about the house. Strips from an old oak bedstead will make a strong tripod, if securely put together.

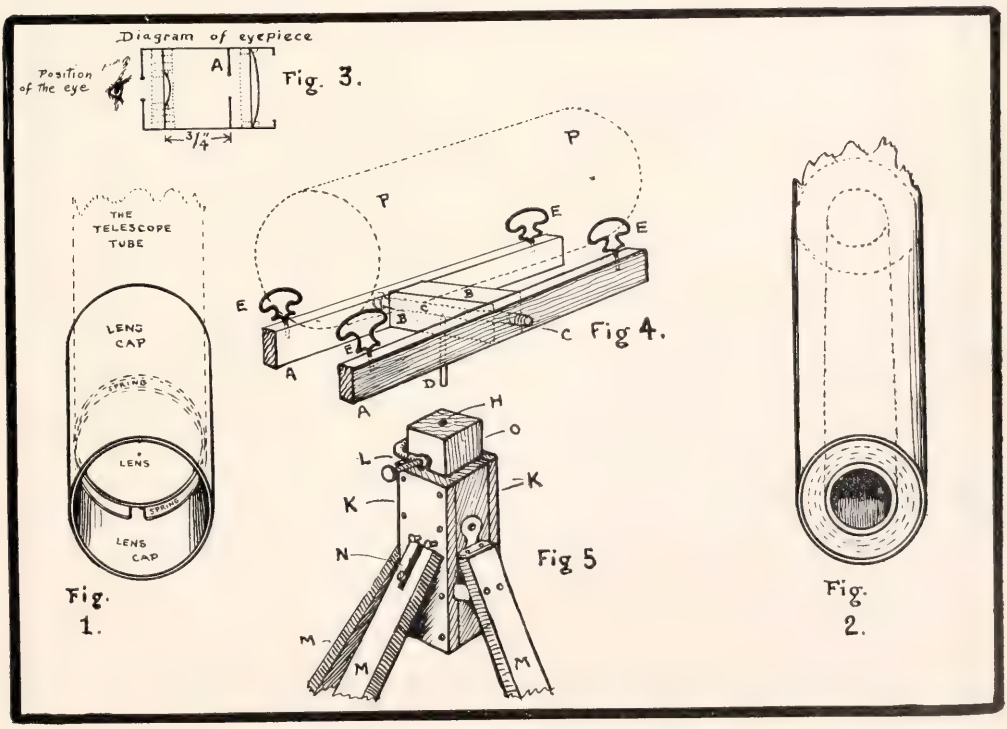
Two wooden pieces (A) Fig 4, two inches wide, fourteen inches long and three-fourths of an inch thick, are attached to the ends of an oak block which is two inches square on the ends, and three inches long (B) Fig. 4. A bolt, five and one-fourth inches long, having a fixed head on one end and a thread on the other, passes through the center of the ends of the three-inch block (C) Fig. 4. A nut screws on the threaded end to hold the pieces tightly to each end of the block, but allows them to

oscillate freely about the bolt as a center. A large steel nail (D) Fig. 4, five inches long, is driven into the under side of the block and the head is removed. Two clothes hooks are screwed into each of the wooden pieces (E) Fig. 4, near the end; a short cylinder (P) of heavy pasteboard is tied to the pieces and is held in place by the clothes hooks. The telescope tube is to be inserted in this cylinder as shown in the photograph. A movable block (O) Fig 5, is held in a box (K) Fig. 5, by a clamp (L) Fig. 5, and three oak strips (M) Fig. 5, are securely fastened to the box. One strip may be arranged (N) Fig. 5, so that it can be removed, if it is found more convenient. The nail (D) Fig. 4, is inserted in the hole (H) Fig. 5, and provides the horizontal movements of the telescope.

With a double convex or a meniscus lens, the full aperture will be used only in looking at stars and nebulæ; the planets, sun and moon are best seen when a diaphragm is placed before the lens. Ordinarily, the aperture should be less than two inches, but it is well to try several sizes.

A thick piece of dark glass can be fixed over the eye lens, to make a solar eyepiece; but the best way to observe the transits or sun spots, is to point the telescope at the sun through a hole in the window curtain. A very large image of the sun can be projected upon a white screen in a darkened room.

We can see some of giant Jupiter's belts, and can watch, with much interest, the changing positions of his four moons. The phases of Venus and the rings of Saturn are interesting objects for our glass. The moon affords the most pleasure, when the conditions are favorable for the best "seeing." With a realism that is startling, the craters, walled plains, and the bright glowing mountain peaks stand out, in strong contrast from their black shadows.



DIAGRAMS TO SHOW CONSTRUCTION.

THE CAMERA

CLEAR PHOTOGRAPH OF A GULL.

Here is a remarkably good photograph of a herring gull. Every detail is clear. Of the bird the Audubon Society (to whom we are indebted for the cut) has this eulogy and description:

"If there is any one kind that deserves the title of our national water bird it is this harbor gull, for it is found in the Northern Hemisphere wherever there is a sufficient body of water to yield it food. For the three or four months of the year that are its breeding season, it may be seen only northward of Maine, the Great Lakes, Minnesota and British Columbia, and in the northern parts of the Old World; but for the rest of the year the harbor gulls travel southward as far as Cuba on the east, and lower California on the west; and, in Europe, southward to the Mediterranean; in great flocks or only small groups stopping to winter as regularly in certain haunts as the migrant song-birds return in spring to their old nesting-places.

"They are very sociable birds at all times of the year, keeping in colonies even in the



HERRING OR HARBOR GULL.
From a photograph made by William Dutcher in the protected colony on Duck Island, Maine.

breeding season, a time when song- and other land-birds pair, and prefer to be alone. Trees are sometimes used for nesting, but the ground is the usual place. The nests, when on the ground or upon flat rocks, are built of grass, mosses, seaweed, and bits of soft driftwood formed into a shallow bowl. If the edges of this flatten or crumble while the birds are sitting, they use bunches of fresh grass or seaweed to keep it in repair, with the result that the nest is not only a very tasteful object, but it blends perfectly with its surroundings."



AN EXAMPLE OF GOOD POSING FOR BIRD PORTRAITS.

PET SCREECH OWLS.

The accompanying illustration of two pet screech owls was kindly supplied to THE GUIDE TO NATURE by Dr. R. W. Shufeldt, New York City. He kept these owls as pets in a city home for several years and had many interesting experiences with them.

HOMESICK UNTO DEATH.

BY BESSIE L. PUTNAM, CONNEAUT LAKE, PA.

Love of liberty may be discerned in even the humblest of God's creatures, and while the incidents related can scarcely be pigeon-holed with premeditated suicides, they certainly indicate a homesickness which resulted in indifference to life, its joys, and necessities.

Some years ago, two horned toads, or properly speaking, horned lizards, were sent to the writer from California, arriving apparently none the worse for the week's ride in a tin box nearly across the continent. The larger measured just six inches in length; the smaller, two; and both were beautifully marked in almost white, black, and all the intermediate shades, this mimicry of the sands in which it lived being a not uncommon protective device among animals.

They absolutely refused all vegetable food, and seemed insulted if a dead or maimed insect was placed before them. They were equally averse to eating under the scrutiny of human eyes, and when a choice six-footed bite was offered they would close the eyes, sometimes partly opening one in a moment to watch the insect; and only after we had retired would the swift tongue dart forth and instantaneously appropriate it, provided Mr. Insect had not in the meantime walked away—which he usually did.

Despite persistent efforts on our part, they grew more and more emaciated, the clear colors changed into the dingy hue of the clay dust into which, with one or two dextrous flops, they were wont to bury themselves so completely that only the upper portion of the head and eyes protruded. But this position, an ideal one in their native sands, availed not as a food-gathering ruse in captivity, for few insects passed within reach of the cage.

The larger toad, more shy, and consequently catching fewer insects, lived just a month. The smaller survived it a fortnight, and was, as a last resort, released in the garden, though never for a moment lost from sight. But though ants and bugs passed and repassed within reach it was too sick or homesick to notice them, and in spite of our best intentions it died, to all appearances from starvation in the midst of plenty, simply because it would not eat.

It is recorded that horned toads sometimes eject blood from the eyes in self-defense. Our pets, though frequently handled, never showed signs of resentment until their last moments. Voiceless before, each, with a peculiar squeak, rushed toward the hand of its mistress with widely opened mouth as though to devour it, and then sank back lifeless.



THE PET HERON.
Photograph by H. W. Putnam.

Whether induced by rage or pain, the phenomenon, being observed in both instances, was doubly impressive.

A Great Blue Heron, *(Ardea herodias)* after being shot thrice through the head, was brutally knocked down by a hunter with the butt of his gun and left to die. Later another hunter, finding that it had regained its feet but was too badly hurt to offer any resistance, carried it home. For the next twenty-four hours it was kept in or at the entrance to a village store, mounted on a dry goods box, absolutely refusing food, and submitting passively to the gaze and strokes of those passing.

It was condemned to death finally by the proprietor, a man too humane to see it starve to death and too busy to experiment with it. Thence it was ultimately rescued and brought to the home

of the writer as a curiosity for the little folks, though it proved quite as interesting to the adults. Blind and too sick to eat, it would only turn its head slowly from side to side when disturbed or curl its head and neck upon its breast. Standing upon one foot with the other drawn up under its plumage was a characteristic attitude.

After a few days it regained the sight of one eye, and the wounds gradually healed. But it still refused to eat. Meat thrust forcibly into its beak was held perhaps for hours, but never swallowed. The only nourishment taken was milk or other liquid forced down its throat with a spoon.

As strength returned our designs were anticipated and its protests increased, the contents of the spoon being usually dashed to the floor in the contest. Finally a small funnel was slipped into one end of a rubber tube and the end forced into the bird's mouth and held there and while one held its beak and the funnel an assistant poured milk and raw egg beaten together down its throat. It soon learned the process, and would turn its head away and try to escape. Failing in this, wings and legs were used, and the meal interrupted two or three times by pugilistic efforts with its formidable beak, emphasized by vigorous kicking and a series of flops from the widely expanded wings.

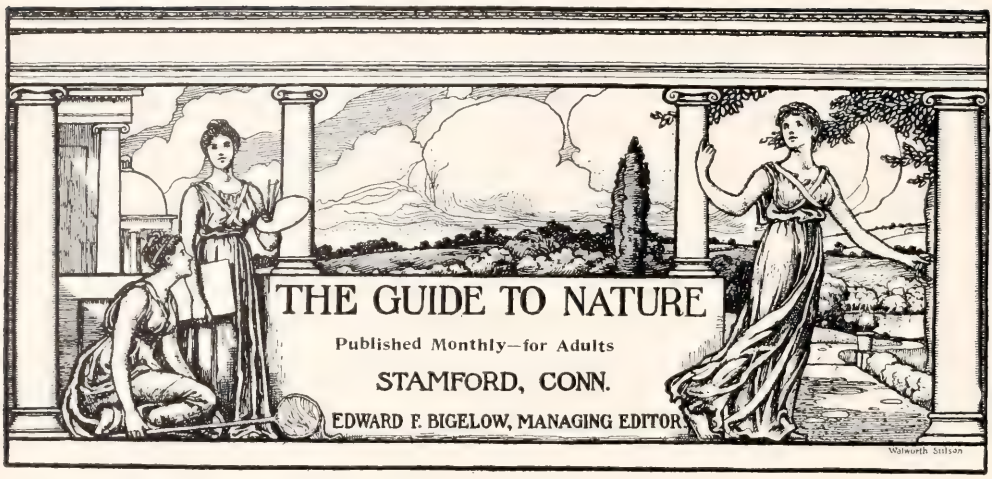
Finally three minnows were placed in a pan of water at its feet. The heron for a minute eyed them sharply, and we thought the victory won; but it gradually relaxed into the stoic indifference so nearly habitual. They were left with it for the night, with the hope that darkness might lure it into the old pastime of angling. Evidently it was not a Simple Simon, and the fish were unharmed. One day the larger, overestimating the capacity of its tank, jumped from the shallow pan, and floundered about almost over the heron's feet before it could be rescued; but the bird regarded it with unconcern. To all appearances it reflected that friends and home had gone and it had nothing for which to live. Its sole comfort in captivity was in paddling over a sod placed in a pail of water. An occasional fishworm was captured from the half frozen ground of early spring and placed in the mud. While it took grim delight in the sods and the water, it certainly did not eat all of the worms,—perhaps not a single one; at least it was never caught in the act, and some were always left in the pail. On one or two occasions pieces of worms were found at his feet; but whether through volition or accident, none can tell.

Barring this possible meagre source, it took no food during the six weeks of convalescence aside from the liquid served amid vehement protests. As soon as the spring weather became mild enough to warrant release in its emaciated condition, it was taken to a neighboring woods and given its freedom. Though seemingly tamed and showing neither fear nor resistance excepting when fed, rarely leaving its own corner of the room, the moment it was taken out of doors the wild nature returned and it made frantic efforts to escape, using wings and legs with great force and making some well-aimed thrusts at the eyes of its captor with its powerful beak.

It was released in the bed of a small stream and stood motionless until we strove to approach, when it rose fully forty feet into the air, and after some ill-directed attempts caused by the blind eye, alit on the top of a tall tree. Later it descended to the ground, but not nearer to its captors.

Then, only, was its fine protective covering fully appreciated; for though we knew its exact location, discovery was almost impossible, so completely did the colors blend with the surrounding branches. Even the yellow bill, its most conspicuous mark save the white cap, proved dull on the lower side,as the head was thrown back, alert to the slightest sound or motion. Its policy seemed to be never to turn the back to the enemy; yet so slowly was its head turned to front the intruder that no motion was perceptible; only by comparison with stationary objects could its change of position be detected.

Hoping that it might eventually regain its mate, we left it,—protected more by the garb given by the Infinite than by its strong beak, legs, or wings; a strange example of wild nature which seemed tamable yet could not be tamed; a bird which cared not for a life of captivity.



"WILL BENEFIT CONTRIBUTORS."

"Bird-Lore" for May-June copies from THE GUIDE TO NATURE'S editorial "Glittering Generalities," (page 50 of the May issue) and adds this expressive comment that flavors of longer experience in the same lines:

"If Mr. Bigelow can produce a magazine which will meet this standard (and he makes an excellent showing in his first two numbers), he will benefit his contributors as well as his readers."

"THERE AIN'T NO SUCH ANIMAL."

Somewhere I have read or I have heard a humorous anecdote, in which I saw a moral probably never intended by the author. It was related of an aged, back-country farmer, whose life-long knowledge of animals had been confined to those on the farm. He had come unconsciously to regard them as the only ones in existence.

For the first time in his life he visited a city zoo and there saw a giraffe. He long and curiously gazed at its methods of high feeding and of low feeding. At last his expression changed to disgust and he turned suddenly and went away with a feeling that he had been deceived, for he spitefully remarked, "Thar ain't no such animal."

It had taken several minutes for his vision to take in all parts of the reality before him and for his sluggish mind to reach that conclusion.

At first when I heard this anecdote, though I appreciated the humor, it seemed to lack the ring of genuineness. It seemed impossible for a man to doubt the plain evidence that there was actually such an animal before him. But the more I consider it, the more firmly do I believe that the farmer's opinion was not far from that of most of us. It is difficult for a new experience and especially for a new idea to cancel suddenly a life-long impression and a life-long training. Be the proof ever so real, we refuse sometimes to accept it.

Then, too, as a representative of certain animal concepts brought to mind from descriptions in letters of inquiry, I am sure that there "ain't no such animal." These complex and erroneous descriptions more and more deeply impress upon me the need of such work as that of THE GUIDE TO NATURE.

What is needed by us all is to see clearly and to describe accurately. We color and distort too much, too often.

THEY, TOO, HAVE HAD TROUBLES.

It is refreshing in reading the tabulated technical pages of the "Entomological News," to find this touch of humanism in the editorial page:

We have touched on this subject before, but would again like to remind our readers that we are not egotistical. To those who so kindly write articles for the News we wish to say that the editors of this journal are the most learned people in the world, and in addition to that are mind readers. Also, time hangs heavy on our hands as we have nothing to do. Don't take the trouble

to number the pages of your Ms. as we can do it better. Write botanical names and names of places any old way. We know all the botanical names and have become familiar with all localities, having lived in each one.

When you give the measurements of insects, especially new species, you need not write the figures plainly, as knowing everything we can readily decipher them. The names of all new and proposed species are known to us in advance, and knowing them your self it is not necessary to be particular about how you write them. When writing us you need not be particular about your name and address, as we can read everything. If errors occur just blame us and the printer. The printer, by the way, is a wonder. He reads Russian, Chinese and Sanscrit with greater facility than he does English. The collecting season has begun, so we may be able to forget the editorial department for a time.

P. S.—Don't forget to mix up exchange notices and other matter for the news with personal matter to the Editor.

REMARKABLE BUTTERFLY STORIES.

In an account of the funeral of Willis A. Bardwell, the "Plymouth Chimes" (Plymouth Church, Brooklyn, N. Y) has the following regarding the remarks of Dr. Raymond at the funeral:

"A strange thing happened once in that old Montague street library, which you all know so well. William Hamilton Gibson—one of the bright, brave souls of Plymouth Church—had been working at his summer home in Connecticut, upon a magazine article about butterflies and illustrating it with his own exquisite drawings from life, but when he had nearly finished it, he found to his dismay that the most magnificent species of all was no longer flying among the New England hills. So, as a last resort, he came to Brooklyn and sought in the Brooklyn library an illustrated work from which he might copy the picture he needed. Mr. Bardwell entered sympathetically into his desire and soon brought down from its seclusion a great folio of plates, which he laid upon the table before his friend. Together they turned the leaves until, to the artist's joy, they found the page upon which, in the size and coloring of life, the beautiful creature was depicted, and over it, in mutual delight, the lover of books and the lover of all living things—lovers,



THE BUTTERFLY CARVED ON THE MONUMENT

both, of their fellowmen also—bent their heads.

It was a balmy day of early autumn, and high above them, in the topmost tier of galleries, a window was open. Through that window came a splendid butterfly of the species which Gibson was seeking, and circling downward, as if looking into the alcoves of each gallery, it came at last to the lowest floor, sailed fearlessly into Mr. Bardwell's alcove and passing between the two bowed heads, alighted on the page before them by the side of its portrait!

Mr. Gibson himself told me this story, and we who were his summer neighbors in Connecticut could have matched it with other instances of the fearless confidence with which all living creatures seemed to regard him. But in this case the butterfly denizen of the air was not afraid of Mr. Bardwell either, and the whole scene has remained in my thought as that of a benediction descending upon two pure and gentle souls!

Remembering that the butterfly is the radiant Christian symbol of resurrection and new life, may we not fancy that over this refined, absorbed student of the truth of the Spirit in books, the Spirit itself, the real Life Eternal, hovered until at last it alighted before his eyes, to take forevermore the place of all imperfect and transitory copies of it?"

The following number (May) of the same publication contains this letter:

THAT BUTTERFLY STORY.

To the Editor of THE CHIMES:

I mean the story Mr. Gibson told Dr. Raymond, which Dr. Raymond repeated at Mr. Bardwell's funeral, and which is reproduced in April "Chimes."

Had it not come straight and from so straight-speaking a man as Mr. Gibson was, many would think it some story-teller's waking dream. I can, however, pretty nearly match it by something in my own experience.

You know how enthusiastically the last fifteen years of Mrs. Ballard's life were devoted to the study of butterflies and moths. Naturally, I wished that a butterfly should be one of the emblems carved on her monument; not for that reason only, but also because the beautiful winged creature is a type of that marvelous change at death in which, as in a glorious immortality, she was so confident a believer.

Well, one day my artist showed me a butterfly which he had succeeded in capturing for me. "No," I said, "that is not the kind I want and you must wait until I find one." None appeared, and it began to look as though I were to be disappointed in my wish, until, standing by the grave of one who had been one of Mrs. Ballard's dearest friends and while looking at the tall vase of flowers there, a butterfly just such as I desired came flying over my shoulder from behind me and lighted on the flowers in front of me. I caught it, took it to the sculptor, and here it may be seen carved on my butterfly-lover's monument.

Sincerely yours,

ADDISON BALLARD.

Pittsfield, Mass., April 14, 1908.

THE ALL COMPRISING.

I once advertised in two Stamford newspapers that I desired to purchase wood snails and bullfrogs. The number and variety of natural history specimens brought forth by the advertisements would do credit to a local museum—but with two exceptions—there were no snails and no bullfrogs. Young and old evidently ransacked all local creation for "bugs an' things" and "varmints" and "creeters." In a way, I appreciated the promiscuous offerings for I am a firm believer that "everything is 'fish' that comes to the net of a naturalist." I was glad to know the reputation that I had in the mind of the local public as to my interest in "the heavens above, the earth beneath and the waters under the earth."

However, much as I appreciate this evidence as well as the heterogeneous and promiscuous collection, the drawback was that neither of the two classes which I wanted for a special use was represented.

I questioned the army of hunters and found only one who had any idea of a wood snail, and he, I learned, had a confusion of ideas about snails and slugs. I questioned and instructed and the army went forth once more, but I have not yet a snail.

To my intense astonishment, not one of the searchers knew what a bullfrog

is. I found that in popular language a "bullfrog" means any kind of a frog or even a toad. The offerings of toads were especially numerous. One paper bag contained twenty-five. Though many of the collectors necessarily made no sales, I hope they learned some lessons in nature study. I at least faithfully tried to teach them.

I had impressed upon me two important facts:

First, the general lack of definite knowledge as to commonplace things. Second, the important part that discrimination holds in nature study and the general lack of it in the mind of the general public, at least in the mind of my collecting public.

Imagine, if you can, calling up a grocery store by telephone and ordering a bar of soap or a pound of butter, and that later you have delivered at your front gate a wagon-load of everything in that store (except soap and butter), and you will appreciate my astonishment.

There is probably not a person in Stamford who does not know a Madagascar monkey or an elephant from India, but no one seems to have any acquaintance with a snail or a bullfrog.

As the result of iterated personal instructions I later obtained a few bullfrogs, but I have not yet a single snail.

THE OLD AND THE NEW IN MICROSCOPY.

One of the most heartfelt articles that THE GUIDE TO NATURE has published is "The Amateur Microscopist," by Professor Earl Douglass, in this number.

The mingling of plaintive sorrow for the disappearance of the old time interest, with the plea for its restoration, and the gleams of hope for the future—all are touchingly and delightfully intermingled, and are such as proclaim the writer unmistakably a true student and lover of nature.

I especially can sympathize with the author. With many of the subscribers to THE GUIDE TO NATURE we were workers together in "the old times" when I edited "The Observer" magazine which more than any other publication in the United States represented for almost a decade the interests of amateur microscopy.

Frequently do I take from a library shelf near my easy chair the much treasured volumes of "The Observer" and linger lovingly over the department of "Practical Microscopy" so ably edited by Miss Booth, in those good old days of amateur investigation. I, too, have longed for a restoration; have felt the pathos of existing conditions; have indulged in gleams of hope for the restoration of "Practical Microscopy" even in THE GUIDE TO NATURE.

But it has been only a gleam, only another realization that "life is a series of pictures and they come our way but once." We may go back to the scenes of our youth or to some much loved spot of later acquaintance, but it isn't the same picture.

And after all, isn't it a good thing that this is so, and that the world changes and progresses?

Our older readers will readily understand all that Professor Douglass says. But let none of our younger ones misunderstand him. "The microscopist seems now nearly extinct, and the word by which we used to have to designate him is nearly obsolete."

The microscope is now more in use than ever. Formerly it was in the hands of an enthusiastic amateur here and there, or of the esoteric few who gathered weekly to discuss the merits of sub-stage, swinging mirror-bar, achromatic condenser, structure of diatoms, the continuity of protoplasms, numerical aperture, black-dot resolution, the continuity of others of the kind that were so dear to the amateur's heart.

Now the microscope is in use in every high school and college laboratory and by hundreds of specialists in every department of nature investigation. The principal value of the old time days of amateur microscopy was to develop the instrument. Before Abbe's elucidation of Numerical Aperture settled the question amateurs raced objectives as a sporting man races horses. The manufacturers met the increasing demands of devoted amateurs and the development of the instrument was hastened. It is now practically perfect. The interest in the instrument lasted during its growth. Now the interest is in its use. We have lost the amateur mi-

croscopist but we have gained the naturalist, the modern efficient professional naturalist, and the modern popularization of nature interests.

Our author concludes his excellent article with this sentence, "If this is done, the coming generation will see the revival of the good old microscopy, and the revivication of the good old microscopist." I believe we need to revive only the zeal and devotion of the old time microscopist and apply them to the use of the microscope as one of the many aids in being a naturalist. The building has been erected; now let us make it our home. There are plenty of well developed microscope objectives, plenty of well devised methods. Now let us have the use, in nature, with the enthusiasm and zeal of the old time microscopist.

THE GUIDE TO NATURE advocates not the formation of clubs of amateur microscopists, but Chapters of nature students who will freely use the microscope or any other apparatus that will aid in the knowledge and the love of nature.

Special terms are only to distinguish special things. When that thing becomes universal the special term is dropped. Sir Isaac Newton may have heard discussions of "gravitationists." No one now is a "gravitationist," because all are in that list. The word evolutionist is dying for the same reason. If a boy purchases a bicycle, do we need to differentiate him as a bicyclist; or if a man purchases an automobile, is he an automobilist? No. Those machines of locomotion are too common for that.

So mourn not if the words by which we used to designate an intellectual pursuit and its cultivator are nearly obsolete. Let us bury them, even if with tears for the past, in the ground of common use. So, too, expel the term camerist; as well say field-glass-ist, vasculumist or net-ist.

So long as people shall see, shall have minds to know and hearts to love, I have not the slightest fear that the use of the lens will become less in those phases of nature where a lens is needed.

The very commonness of microscopy has made the term microscopist no longer necessary. Common use as well as disuse can make a term obsolete. We all have had our regrets, our tears—yes, even THE GUIDE TO NATURE its spasmodic attempts at resuscitation. And no one appreciates the pathos of it all more than the editor!

We mourn for the death of amateur microscopy and for that of microscopy of any kind.

Let us rejoice in the fact that there have been born the nature lover and the student who use the microscope. Let us all combine to increase that *use*.

THE AMATEUR'S INTERESTS.

Since writing the above, I have received from one of the most proficient of the old time amateur microscopists a letter from which I quote the following:—

"The amateur cared, and now cares, little about 'cell structure,' structure of nucleus, differentiation of staining fluids, technical descriptions of some creature of which he never heard until the proceedings of some learned Society asked him to read of it, and in which he feels no interest. Ray Lankester says that the amateur has disappeared because science has become too difficult for him, dealing as it now deals, chiefly with cell structure and staining fluids. The amateur never tried to do, nor wanted to do, such work. He was content to leave all that to the professional. What he wanted was to talk and write about his own observations and to ask his friend or reader, 'Have you seen that?' although the observation may have been an eon old and the common property of every professional in Christendom. All that he wanted was 'to potter about on the edges of things.' He has vanished principally because there is now no longer any excuse for 'fighting objectives' nor discussing angular aperture. Abbe's N. A. killed all that by settling the question for the rest of time."



ORNITHOLOGY

THE WARBLERS.

BY EDMOND J. SAWYER, SCHENECTADY, N. Y.

The best place for warblers at this time is a hard wood on wet ground, or with a brook running through it, and with a rather dense lower growth of maple and dogwood. The species differ widely in habits during the breeding season and somewhat while migrating, but nearly all are associated closely at this season. Such a gathering of colors and display of charm and animation is not to be seen among any other birds. Scores of the little rainbow tinted creatures on every side of you flitting and flashing and calling with sweet lisping voices among the fresh green of the new buds—the scene can hardly be imagined.



THE REDSTART WARBLER.

Of summer residents and semi-annual visitors, about sixty species in all, twenty to thirty may be looked for during the month in any favorable wood. It is not difficult to identify a dozen species in a small wood on a single morning's visit. So beautifully colored and diverse are even the commoner warblers that as a family they are always interesting; so that, though a certain rare species may elude you, you will never be quite disappointed. The possibility of seeing one of the rare ones always gives me an indescribably pleasant thrill in watching these birds. I recall one twenty-eighth of May when I found the "rare" bay-breasted warbler, the very commonest species in a small wood where warblers of half a dozen other species were numerous.

Owing to the nature of the cover they frequent, these birds may often be seen at very close range, making identification easy, even in the case of such tiny birds, for all but a few in this family are below the size of a sparrow. But for the most part, a field-glass will be found invaluable; this chiefly owing to the small size and extreme nervousness of the birds, and the similarity of their calls. The song of the water-thrush (a brook loving warbler) is a beautiful ringing strain not to be confused with any other song-bird. The oven-bird's call of "Teacher, teacher, teacher," is well known and peculiar. The song of the yellow-breasted chat would be remarkable even in the throat of a first cousin of the mocking bird, but for a warbler's song it is astonishing in the extreme. However the chat, while classed with this family, departs from the other members in almost every respect, being twice the size of the smaller species, and a perfect eccentric in its habits. The typical warbler song is a rather weak

"tseeping" of a few seconds' duration; the species differing, as a rule, only in inflection and accent. For illustration: here is my memorandum on the song of the black-poll-warbler: "See, see, see, see, see, see, see," each syllable distinct, the first and last comparatively low, the song evenly increasing in accent to the middle, then as gradually decreasing to the end,—like the chipping sparrow's trill rendered much slower."

It is probably impossible to get beyond the point of occasional confusion in mastering the songs of the warblers. The song of our common summer yellow bird or yellow warbler, is a typical warbler-song, as the singer is a typical warbler; beautiful, animated, confiding, and useful, this is one of the most interesting, as he is one of the most common summer residents. It is this little warbler who is so often seen pulling the knots of a clothes-line for lint to line his nest. The nest is usually built in a bush, perhaps a rose-bush beside the house. Made of fine shreds of soft wood-fiber, horse-hair and the like, and built, as above stated, in a bush, it is a good example of a warbler's nest.



THE BLACKBURNIAN WARBLER.

The red-start, chestnut-sided warbler and Maryland yellow-throat are common summer birds, more retiring in habits than the yellow warbler. The first two are wood-loving, while the last prefers a patch of tall weeds bordering a wood or bushy thicket. Among these

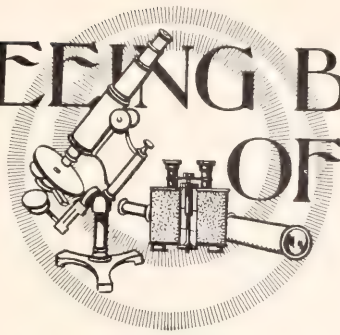


THE YELLOW WARBLER.

weeds this warbler will skulk and scold at an intruder, as much afraid of being seen as his famous relative, the yellow-breasted chat. The names in general of these two are in fact very much alike, as is their coloring,—the only notable difference in the latter respect being that the whole side of the yellow-throat's head is black, while the chat's head has only a small area of black about the bill. The red-start, a fly-catching species, is a remarkably beautiful bird,—whole head and upper parts glossy black; wings with a broad band of salmon across their middle, otherwise black; middle feathers of tail and ends of the others, black, the rest of the tail salmon; sides, bright salmon-red; belly, white. The redstart's song and also the nest, is similar to the yellow warbler's; the nest, however, is placed in the crotch of a sapling, seldom if ever in a low shrub.

The black and white, Canadian, worm-eating, Nashville, Connecticut, and Wilson warblers build on the ground; while the black-throated green, cerulean, Blackburnian, bay-breasted, and magnolia warblers build in the coniferous trees of Canada or northern United States.

SEEING BY AID OF THE LENS



THE AMATEUR MICROSCOPIST.

BY PROFESSOR EARL DOUGLASS, CARNEGIE MUSEUM, PITTSBURG, PA.

Not many years ago there were, all over our land, enthusiastic students of microscopy, men and women who used the microscope for the delight that it gave them. They knew their microscopes as horsemen know the horse, and took as much pride in beautiful instruments as lovers of animals take in fine herds. The manufacturers of microscopes made instruments of grace and beauty, yet some enthusiasts had their microscopes made after their own designs. As breeders breed fine heads or legs on their horses, so microscopists made improvements, as they fancied, on regularly manufactured instruments.

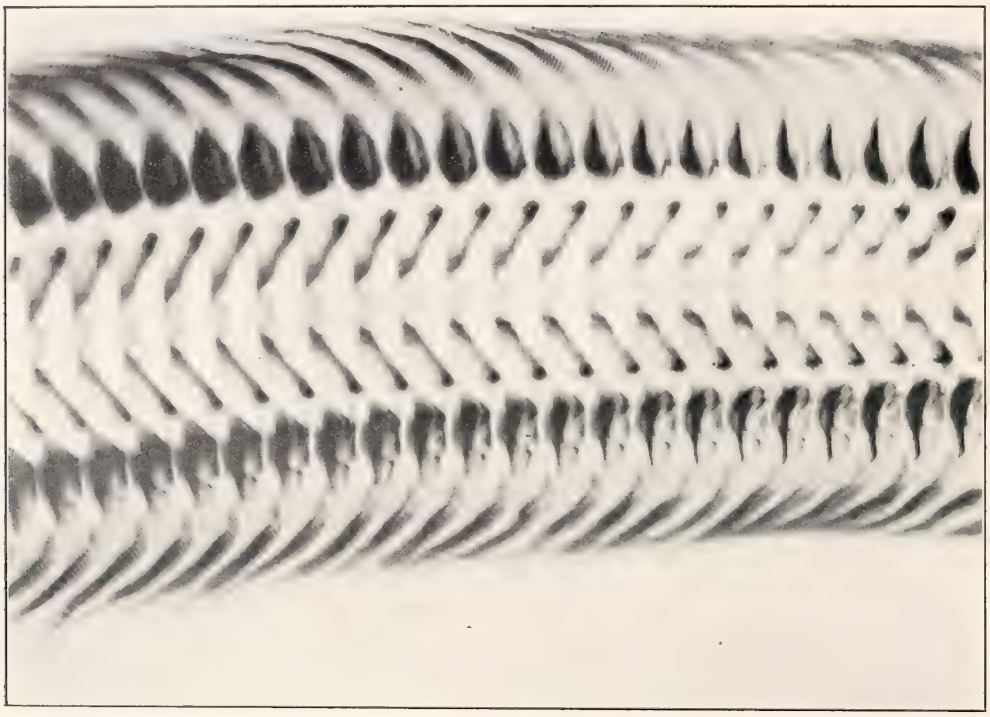
But the microscope was not a mere toy. No invention, perhaps, has been of more practical service to man. Besides, men who were using the microscope for the delight of looking into another world, there were many who were studying human tissues and physiological processes, and discovering, in the unknown realm, the mystery of disease and death, and doing it as a business.

It is undoubtedly true that the most important discoveries were made by men who were stimulated by the fascination of discovery, but these men used the microscope as an axe, a typewriter or any kind of machine is used. They wanted the implement that was best adapted to their work. Many of them objected to the graceful, beautifully constructed microscopes which our American manufacturers had made. They did not complain so much of their optical qualities, but they said they were too tall, not compact enough; they were not built right, for convenience and long continued work, as they required an unnatural position of the body, especially of the head and neck; so they sent to Germany and bought the heavy, often clumsy, and comparatively unsightly instruments which were manufactured there. As American manufacturers were making instruments to sell, they listened to the controversy and profited by it. They saw that there was a demand for the compact laboratory microscopes, so they made instruments after the continental model, and at the same time also made those that were more artistic.

But for some reason microscopy began to wane. Many of the thriving microscopical societies died out. The beautiful monthly periodical, "The Microscope," was bought by a more technical journal which lived for a few years and then became extinct. Go now to the catalogue cards of a large library and under the reference to nearly every microscopical periodical you will read this epitaph, "No more published." The microscopist seems now almost extinct and the word by which we used to designate him is nearly obsolete. Some of us do not like to have the word dropped from the vocabulary, for it calls up so many pleasant associations, so many fond memories, and then, too, some of us believe that a principle is involved. The microscopists did a splendid work in the development of microscopical science and they did it from pure love, not on account of any sordid interests. The making of money is perfectly legitimate, and thorough investigation in some special practical line is necessary to the advancement of science, but among the most noble human characteristics are

broadness of mind and soul, and work for the love of the work.

Do not think that I am complaining. There is nothing discouraging so far as the past is concerned. An immense amount of vitally practical work has been done in technical investigation, but it has progressed none too rapidly. May its speed be accelerated instead of hindered.



"TONGUE" (RADULA) OF SNAIL SHOWING RASP-LIKE TEETH.

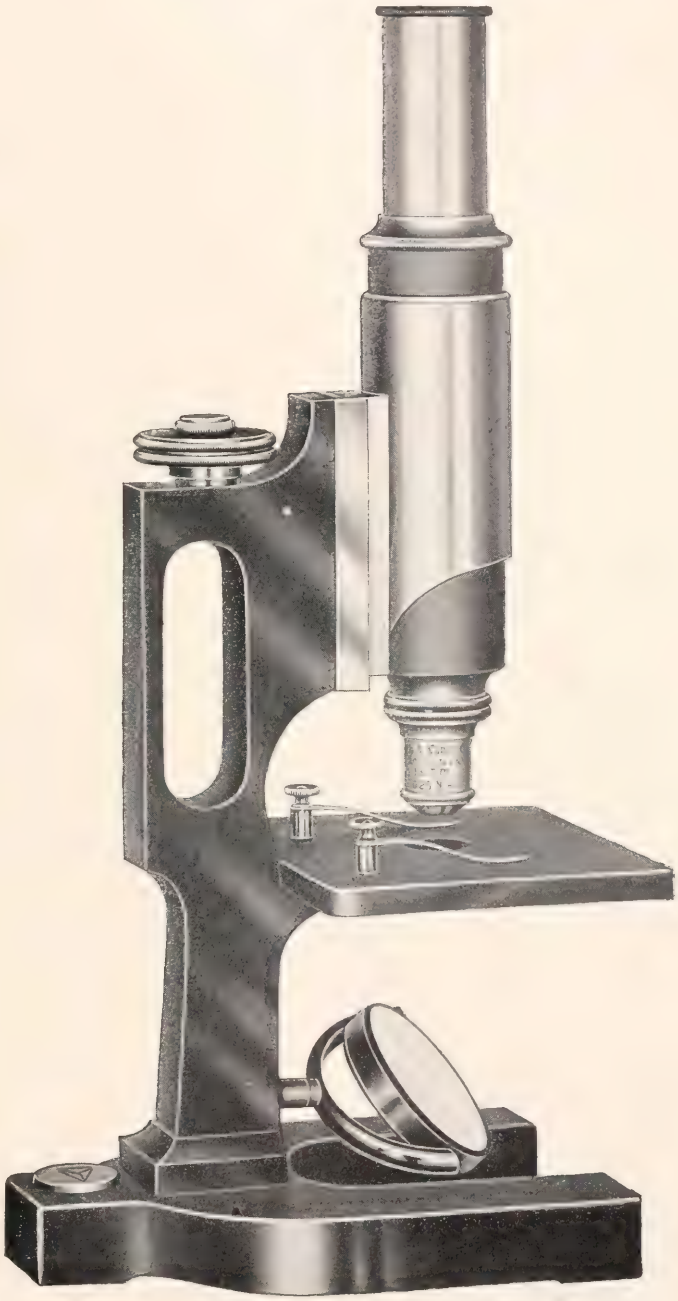
A favorite "Oh my!" object of the amateur microscopist.

From mount by the Rev. J. D. King.

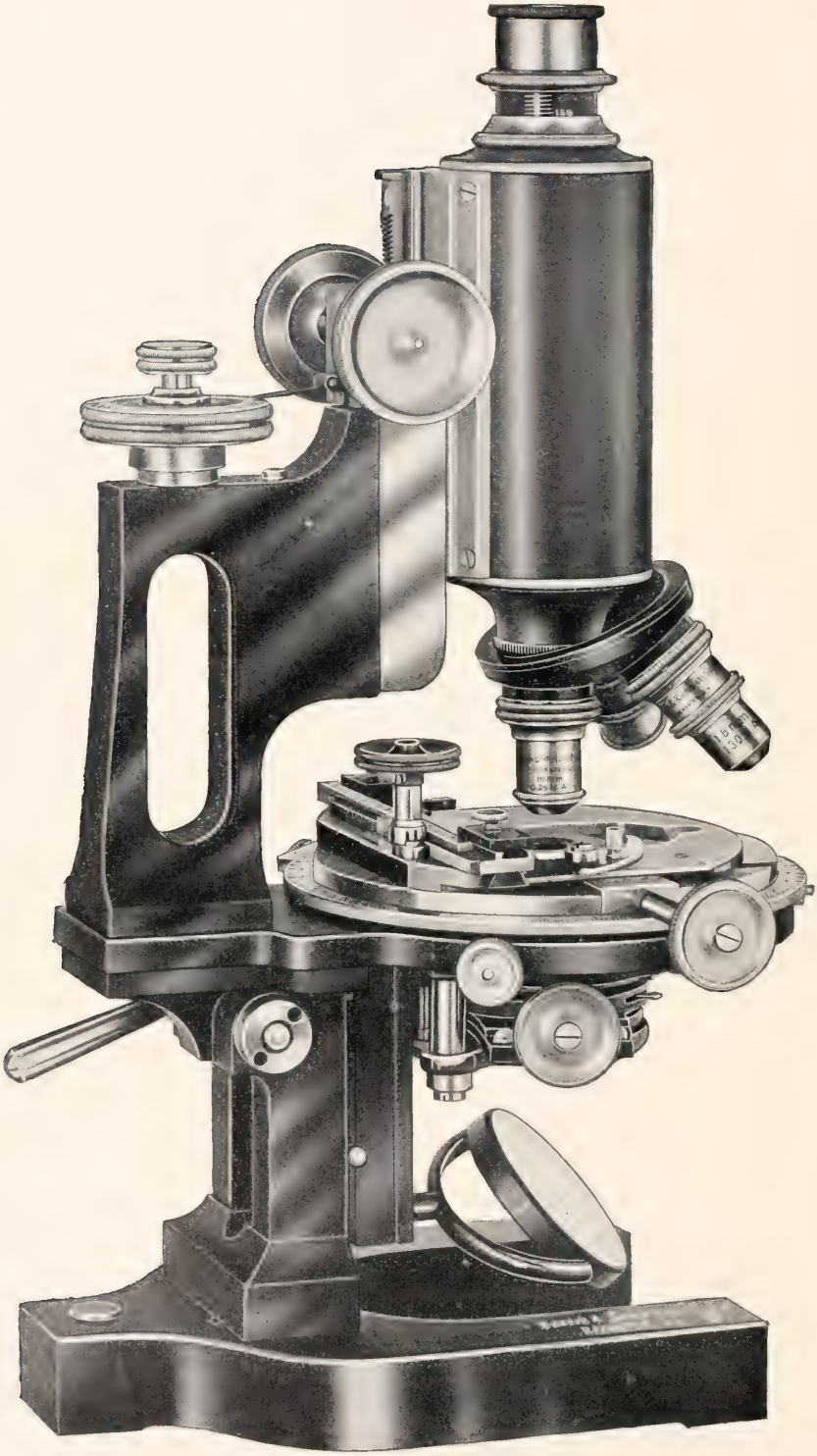
Manufacturers of microscopes have every year been making better and better instruments, not only optically but mechanically. Some seem almost perfect; and though the patterns are nearly all of the continental type, some of them are very beautiful as well as serviceable. If microscopists again become numerous, as I hope they will, and if they know what they want as well as the so-called "practical" men have known what they want, the manufacturers will supply the demand. When there is a demand for a magazine to help, to encourage, and in a way to unite microscopists, it will be published. When books are needed that cover a new field or treat the subject in a better way for the non-technical student, they will be printed. I am satisfied that there are thousands, old, young, and middle aged, who would be healthier and happier, and life would be fuller, if they possessed and used a microscope. It fills with zest almost every walk or ride in the woods, by the rivers, ponds and marshes, and the pleasure does not cease with the walk nor with the examination of the treasures discovered. It comes up again and again in memory all through life with a strange fascination that increases rather than diminishes with time. The mind is made richer and sees more in the trees, grasses, flowers, ponds and streams.

It seems that there has been for a long time, especially among American people in the country, a longing for the cities, but within the last few years the old primeval instinct to get near to nature is outcropping everywhere. Those who are so fortunate as to have enough

money and have preserved the rare ability to enjoy it truly, can go to Europe, or make excursions in automobiles; but he who becomes enthusiastically interested in nature, though he might immensely enjoy a trip to the west, to Europe or to



AN INEXPENSIVE YET EFFICIENT MICROSCOPE FOR THE BEGINNER.

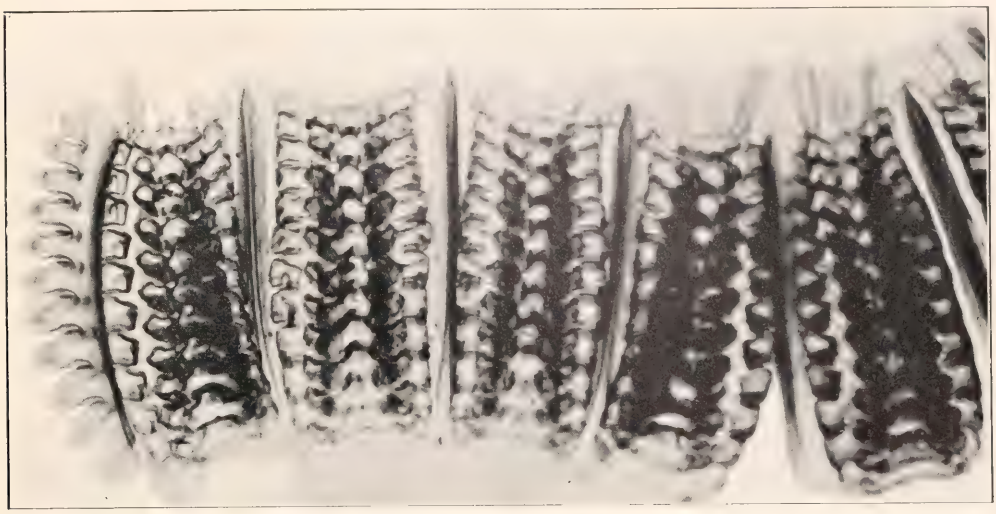


JUST TO DELIGHT THE EYE.

An ideal but somewhat expensive equipment.

Illustrations of microscopes, by the courtesy of The Bausch & Lomb Optical Company.

Africa, finds that his happiness and satisfaction do not depend on such things. Besides the many interesting objects that he can see with the unaided eye, he can, by the outlay of a few dollars for a microscope, discover a strange and beautiful world at home.



AN OPEN GIZZARD OF CRICKET.
To show grinding "teeth."
Well mounted by Miss M. A. Booth.

And there is one class in which I am especially interested, and in whom I place much hope. They are the boys. I have taught them for years, I was one of them myself for a long time, so that I can speak with some authority. I know that they are much interested in nature, and what can show them so much nature in so little space as the microscope.

Microscopes have been introduced into thousands of schools I know, but the Moloch of examinations has been introduced also, and what is naturally a pleasure to the boy is now so associated with what is repugnant that it loses much of its charm and of its beneficial results. I sincerely hope that the microscopes in the schoolhouses will be accessible to the boys out of school hours, and that the school hours will become fewer, the vacations more numerous and longer, as the young people learn to employ them better, and that the pupils will be allowed to do something in school because of their interest in it, something which has not as its final goal an unattractive written examination. I hope, too, that they will get the habit of buying microscopes as well as skates, sleds or bicycles. If this is done the coming generation will see the revival of the good old microscopy, and the revivication of the good old microscopist.

LITERARY AND BIOGRAPHICAL

To the Top of the Continent. By Dr. Frederick A. Cook. New York City: Doubleday, Page & Company. This important book not only chronicles the first conquering of the highest mountain peak on this continent, but it tells of a new gold field 40 miles square, which will probably be the objective

point of a great and immediate mining rush, and also describes the best big game country left in North America. It is an adventurous tale of a perilous trip up rushing glacial streams in a motor boat; of travel with a pack train over a



Copyright, 1907, by Harper and Brothers. Copyright, 1907, by F. A. Cook.

THE TOP OF OUR CONTINENT.

The summit of Mt. McKinley, the highest mountain of North America.
Altitude, 20,390 feet.

land trailed by caribou, moose, mountain sheep and big brown bear; of frosty days and gloomy nights in storm-driven clouds; of the final triumphant piercing of the frigid blackness, beyond both clouds and blue sky, to the pinnacle of Mt. McKinley, 20,390 feet high. Superb photographs of a miner's map of the goldfields add to the value of the book, which is a revelation of north exploring achievements in our own country.

BIOGRAPHICAL.

Dr. Cook was born of German-American parents June 10, 1865, at Callicoon, among the Sullivan County hills of the upper Delaware. Before the boy became man he sought his fortune in New York, worked his way through the College of Physicians and Surgeons, and established himself in the practice of the profession. At the age of twenty-six, he made his first journey to the North, as surgeon of the Peary expedition of 1891-92, during which he devoted special attention to studies of the Arctic highlanders then, for the first time, brought into contact with modern scientific methods and study.

"The Miranda" expedition of 1894, of scientists, sportsmen and explorers, was organized by Dr. Cook, and brought by him through perils of ice and sea, safely home, though the "Miranda" was left at the bottom of the sea. While disabled at Sukkertoppen, Dr. Cook led a party in an open boat to Holsteinberg, whence relief was obtained and subsequently shared with the late Capt. Dixon of the Gloucester schooner "Riegel," the arduous duty of the return voyage.

In September, 1897, Dr. Cook assumed the post of surgeon of the Belgian Antarctic expedition, joining the ship at Rio de Janeiro, and nearly two years later returned, having brought all the ship's company, with a single exception, safely through the first Antarctic night, for which distinguished service he received gold medals from the Geographical Societies of Belgium and Antwerp, and with the rank of Chevalier from the King of Belgium. The narrative and a resume of the scientific work of the expedition were later published by Dr. Cook in "Through the First Antarctic Night."

In 1901 Dr. Cook revisited, as surgeon of the Peary "Erik" auxiliary expedition, the scenes of his northern work of ten years before.

In 1903 he led the first expedition to attempt the approach and ascent of unknown Mount McKinley in Alaska and three years later first of men, with a single companion, reached its summit after many thrilling adventures which he describes in "To the Top of the Continent."

Dr. Cook sailed a fifth time for the north in June, 1907, and was reported in winter quarters at Etah, North Greenland.

THE A B C AND X Y Z OF BEE CULTURE. By A. I. and E. R. Root. (116th thousand) Medina, Ohio: The A. I. Root Company.

This standard encyclopædia of the practical methods of bee-keeping grows better and better with each succeeding edition. This recent revision takes a long stride ahead of any previous. It is well written and carefully edited, and excellently printed and illustrated. It should be in the hands of every bee-keeper.

DIRECTORY TO THE BIRDS OF EASTERN NORTH AMERICA.. Illustrated with many woodcuts and twenty plates drawn and engraved by the author. Written and published by C. J. Maynard, West Newton, Mass.

This is a convenient pocket manual, intended primarily for use by the pupils in the author's bird classes, yet none the less valuable to all other ornithologists. The key is conveniently arranged according to the habits and locations of birds.

THE BIRD OUR BROTHER. A contribution to the study of the bird as he is in life. By Olive Thorne Miller. Boston: Houghton, Mifflin and Company. $1.25 net. Postage, 10c.

What Beebe's "The Bird" is to physical parts, this book is to the psychological characteristics. The book is wholly for the "general reader," so it claims. And I wonder if that includes the ornithologist. Is not he, also, a "general reader," at the same time,—or is it at

other times that he is scientist? But I am diverging. The studies are for the lovers of birds who have a sincere desire for better acquaintance with bird lives, loves and enjoyments.

Even the table of contents is inviting. It invites to consideration, not of classification, where to hunt for birds, etc., but of individuality, intelligence, language, education, affections, courtship, amusements, odd ways, etc. The book has an idea, and in many respects a new one. It is well worked out and presented by the talented author.

GRAY LADY AND THE BIRDS. Stories of the bird year for home and the school. By Mabel Osgood Wright. New York: The Macmillan Company.

I must confess that since I first saw a copy of this book it has been a puzzle. I often find myself wondering whether the study of birds requires such an attempt at coating and whether this kind of coating is really "sugar." Do our grown up friends who want to interest young people in the study of birds require such a round about aid? It must be that there is a public demand, for the publishers are shrewd and the writer is talented. On these two points only is there convincing of necessity..

The author is an interesting story-writer, and a proficient, enthusiastic student of birds. I wish she had made two books: one, "The Gray Lady"; the other, "The Birds."

NORTH AMERICAN TREES. Descriptions and illustrations of the trees growing independently of cultivation in North America and the West Indies. By Nathaniel Lord Britton, Ph. D., Sc. D., Director-in-Chief of the New York Botanical Garden. With the assistance of John Adolph Shafer, Pharm. D. Custodian of the Museums of the New York Botanical Garden. New York: Henry Holt and Company. Pages 894.

This is a sumptuous and solid appearing volume, of careful description of the trees within the scope of the title. The key is convenient. The descriptions are condensed and scientific. While there is no attempt made at popularization, not an instance of "dropping into poetry" or telling a funny tale of folk lore, as with many "popular" manuals, yet this book goes so directly to the work it proclaims itself to do that it should have liberal circulation for popular use. The language is only reasonably botanical, not occult, and is to be readily understood by any person of fair intelligence. There is an excellent glossary of the special terms.

DAFFODILS-NARCISSUS AND HOW TO GROW THEM. By A. M. Kirby. New York City: Doubleday, Page & Company.

This volume tells all that is really worth while about daffodils—where, what, and how to grow them, and it is also full of suggestions for those who want to do something better than the ordinary in their gardens. These most charming and earliest of the larger flowered spring bulbs—the Lenten lilies, which "take the winds of March with beauty"—are gaining rapidly in popular estimation. Whether for cut flowers, for pots or gardens, or for naturalizing in the meadows, the daffodils are unequalled in beauty. The author has had a life experience with bulbs of all kinds, and grown what is probably the most complete collection of daffodils in America, and has made a hobby of studying them. The first book of its kind dealing with American conditions.

THE LIFE OF ANIMALS. The Mammals. By Ernest Ingersoll. New York: The Macmillan Company.

This book tells of the mode of life, history and relationship of mammals. The first chapter is "Man and the Apes." The last is "Duckbill and Echidnas." Thus it is readily seen that a wide range of mammalian life is represented. There is an equally wide range in styles of illustrations, everything known, and from a great variety of sources. As the work is mostly a compilation, it necessarily flavors of the perfunctory and does not show the author at his best, as he is in "Wild Neighbors." There is, however, the merit of care, faithful work and desire for absolute accuracy on the part of

a competent naturalist. One of the most valuable parts of the book is the list of 270 authorities cited.

There is occasionally a controversial tone as following a quotation from an ancient writer on lemur. The author says:

"Recent developments in literature seem to show that modern readers would accept the same sort of wonder-tales as confidingly as did our grandfathers."

"The quotation is as follows:

"The people say it is very dangerous to kill these lemurs with spears, because if a spear is hurled against one of them it seizes the spear in its flight without being in itself hurt, and in its turn stabs with certain aim those attacking it. They also relate that when the female has borne a young one, she takes the little creature in her arms and tosses it to her mate, who is seated on a neighboring tree, and that he throws it back to the female. If the little one does not fall to the ground after being subjected to this exercise for a dozen times, the parents bring it up with the greatest care; but if the contrary event happens, they abandon it, not even troubling to pick it up."

THE AGASSIZ ASSOCIATION

TO INTRODUCE YOUNG PEOPLE AND NATURE.

This is the season of the year in which The Agassiz Association especially desires to do personal work. Our plans in this respect are better than those of the ordinary "Fresh Air Fund" because we not only supply fresh air, but suggest ideas. We believe that romping and devastating are not desirable as ends to be exclusively sought, but that thought and appreciation should be added to muscular activity.

We want to buy a farm where children from the cities may not only be entertained and nourished but inspired and trained in an affection for nature.

We want more efficient Headquarters for teaching and for the production of help toward the attainment of these objects.

The AA is a humane Society but it does not say by power of an unyielding law that you shall not be unkind to a horse; but it so teaches head and develops heart that there remains no desire to be unkind to any form of animal life.

The AA not merely protects plants but encourages its students to cultivate them.

To all these ends we invite contributions, large or small, and every cent will go directly to the expenses of the work. The President and other officers receive no salary.

There is no worthier cause and none where every cent will count for more.

THE GRAY MEMORIAL BOTANICAL CHAPTER NO. 2 OF AA.

Twenty years ago The Gray Memorial Botanical Chapter of the Agassiz Association was formed for the purpose of mutual assistance in the study of botany, by means of correspondence and the exchange of specimens.

Probably I will be safe in saying that but a very few Chapters of the AA have enjoyed such a long lease of life, weathering the vicissitudes of life and showing as much life as we have at the present day. To be sure we have had our trials and tribulations, yet on the other hand we have accomplished much good work.

We have numbered in our ranks members in all stations of life. Some of our members have held positions under state and national government—some with botanical gardens and some in the business and home sphere and some as instructors in schools and colleges.

Our membership ranks are open to any earnest student of botany.

Officers of the Gray Memorial Botanical Chapter of the AA for 1908:

President: Miss Pauline Kaufman, 173 East 124th St., New York, N. Y.

General Secretary: Mr. George P. Ells, Norwalk, Conn.

Treasurer: Miss Julia J. Noll, 309 East 7th St., Plainfield, N. J.

Members of Executive Council: Mr. Charles W. Allen, Manasquan, N. J.; Mr. Paul A. Herr, Lancaster, Penn.

Any information desired in regard to the Chapter may be obtained by writing to the General Secretary.

A WORD OF GOOD CHEER.

FROM DR. L. O. HOWARD, BUREAU OF ENTOMOLOGY, DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C., MEMBER OF THE AA COUNCIL.

My home while I was a boy was at Ithaca, New York, which lies in a delightful region at the head of Cayuga Lake, with wooded hills, swift streams, beautiful waterfalls, high cliffs, fertile farms, and also, near the lake end, extensive marshes. It is an excellent place, in fact, for the study of natural history. I became interested in insects as a boy of seven, on a visit to Long Island, through a ten-years-old chap by the name of Stewart who was collecting cocoons of cecropia, polyphemus and promethia moths. I carried the newly acquired interest back with me to Ithaca, and, as such things spread in a community of boys, it was not long before a dozen or more of us were collecting butterflies and beetles, moths and bees, and had formed a natural history society with meetings every two weeks at which specimens were exhibited and papers were read. I believe that I happen to be the only one of those boys to continue a branch of natural history as a profession, but I am sure that all of the others retain a vivid interest in such things and that their lives have been happier as a result of their knowledge of outdoor things and of their acquired habit of keeping their eyes open to the interesting phases of nature. At Cornell University, which I entered at the age of sixteen, I took especial work in entomology under Professor Comstock, and after a year of postgraduate work came to Washington to join the entomological service of the government, and here I have been ever since.

There is nothing I can tell Dr. Bigelow, and probably nothing I can tell the people whom he interests which is new



LELAND O. HOWARD, PH. D.
Washington, D. C.

in the way of argument of inducement to observe nature, but there is so much in insect life that still remains to be known, so many interesting facts which the observer however placed can find out that will add to the sum total of human knowledge, that it is a wonder that there are not many more entomologists than there are. I have pointed this out in the introduction to The Insect Book, which in fact was written not so much to tell what is known, but to point out what is not known but which nevertheless can be more or less easily found out. The most unobservant of persons, sitting for example on a vine-shaded veranda, needs only to concentrate his attention for a

few minutes upon what is going on among the insects on or about the very vines that shade him, in order to become interested and to desire to seek for an explanation of the things he sees.

WORDS OF ENCOURAGEMENT.

FROM SUPERINTENDENT HARRY G. HIGBEE, HYDE PARK, MASSACHUSETTS, CORRESPONDING MEMBER NO. 2034.

Your prospectus of "The Guide to Nature" received, and I have been looking it over with a great deal of interest and pleasure. It seems to me that this magazine exactly fits a long felt want with nature lovers, and that it has before it a large field of usefulness.

I have been a most ardent lover of nature since I can remember and have always strongly worked for and urged the principle "Study nature in the woods and fields and not from books, save only to assist in identification." What we need is a magazine that will help us to do just this thing.

I am a member of other organizations of a similar nature, but it seems to me that the Agassiz Association comes right down to the practical part of nature study, and I want to become a member and do what I can to help along an institution which incorporates the principles in which I so thoroughly believe.

I have had a field class in bird study for six years past and am now conducting the seventh season. Perhaps through the Association I may learn of other similar classes and thereby add to mine ideas which will give it a larger field of usefulness.

I can see in many ways how an organization and a magazine which is so thoroughly co-operative with the needs and wants of its members has before it a great field of usefulness and is bound to be a success.

Thus I shall look forward with a great deal of pleasure to the inspiration which I may receive from this magazine and from my fellow members, to seek with a greater interest and a deeper appreciation the wonders and beauties which Mother Nature gladly reveals to all who sit at her feet and learn.

THE SATISFACTIONS OF NATURE STUDY.

BY PROF. THOS. H. MONTGOMERY, JR., UNIVERSITY OF TEXAS, AUSTIN, TEXAS.

One may undertake any one of the natural sciences as his profession, and the majority who do so make the choice out of pure enthusiasm and love for the work. Here I refer not to him who is simply seeking a livelihood, nor yet to him who finds his main interest in the teaching, but to the man impelled by the motives of discovery and research. Perhaps no one is happier than the investigator in his periods of searching for the truth. Then a natural science may be prosecuted as an auxiliary to the profession proper, as one must become acquainted with general biological principles if he would lay the proper foundation for his profession of medicine, or sociology and economics, or agriculture, or psychology.

But apart from the pursuit of natural history as a profession, or as an aid to one, there are many who find a great interest in it more from the standpoint of a hobby; and it is especially for such that this magazine has been founded. In the greater number of our towns, with the notable exception of most of those in the southern states, there exist natural history clubs of one kind or another composed chiefly of amateurs: botanical, entomological, ornithological societies, societies for the breeding of goldfish and geological clubs. The majority of their members are physicians or other professional people, and business men, many of whom would have chosen science as a profession had they only had the opportunity. Then more recently this amateur interest has been widened by the teaching of nature study in the schools, by more attractive exhibitions in the public museums, and to some extent by the trend of modern literature.

Now this interest among the people is older than the term "Nature Study," and must rest upon satisfaction given by the subject. This satisfaction is manifold in its source. To many the observation of nature appeals rather from the artistic side. What attracts

them are the æsthetic elements of woodland and landscape, with coloring and form marvels. I would judge that this is the stimulus to most, for no sharp dividing line can be made between art and science. To others nature study appeals most strongly because it draws them away from themselves and makes them forget for a while the humdrum of existence. Still others are of more inquisitive mind, they are not satisfied with admiration, but wish to understand. Again, a considerable number, particularly among the beginners, are more interested in building collections of natural objects; they are really tentative museum curators.

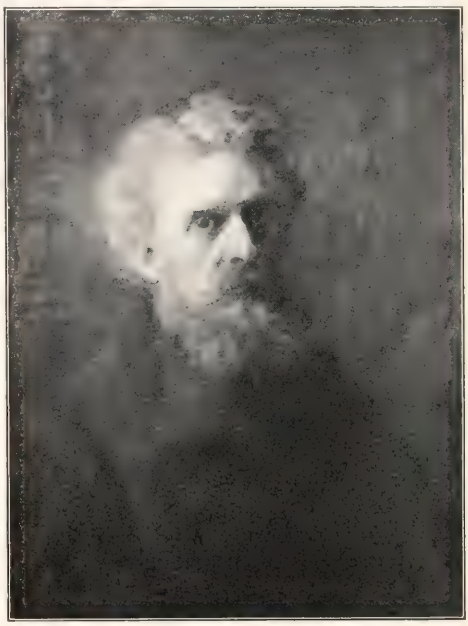
Thus the satisfaction given by the study of nature is many sided, and that is why it appeals to people of very different temperaments. Natural history, when one gets started into it, always proves more pleasure-giving than the reading of newspapers and poor novels, than the haunting of a social club or the nursing of a bleacher at a baseball game. It is within the reach of everyone, rich and poor. It trains all the senses and presents an endless field for the fancy and for thought. Taken all in all it is about the most satisfying hobby that one can undertake, and to keep sane and fresh a man is obliged to have a hobby apart from the daily business. It helps us to forget life's disappointments. The subject presents in right perspective man's relation to nature, and is thereby helping to abolish superstition. It teaches that everyone should feel and think for himself. The pursuit of natural history can lead us back to our earlier, more normal and healthy natural life, from which our over-civilization has withdrawn us.

"THE JOY OF LEARNING MORE AND MORE."

BY FREDERICK LEROY SARGENT, CAMBRIDGE, MASS.

It has always seemed to me that the most satisfactory things in the world to know about are those which are commonest. I believe also that the most satisfactory ideas I can gain regarding them are such general views of their properties and places in nature as will enable me to predict their behavior under various conditions, to tell what I can do with them and what they can do for me —physically, intellectually and spiritually.

The earnest study of common things has led me far, back and forth, over the field of nature, often to inquiries seemingly remote from everyday con-



FREDERICK LEROY SARGENT.
Member of the Agassiz Association Council.

cerns, and yet leading in turn to ideas useful in daily life. While yet a school boy I had the desire to find out all I could about the curious fruit of the common dandelion which helps to make this plant so successful. This early study of the fruit led me later, through watching its development, to a study of the flower. Then were aroused questions regarding the behavior of the floral parts in pollination with reference to helpful or harmful insects and favorable or unfavorable weather. An attempt to understand the floral parts led to tracing their development back to the cradling bud of the leaf-rosette. The history of the leafy shoot with its underground reservoir of protected reserve food and far-reaching roots raised many questions more, not least of which were these:

What conditions does the plant require for making this food upon which its flowers feed? How does its herbage compare as regards food-value for mankind with the edible parts of other plants? How can its value as a vegetable be increased?

I have wondered how far selection has availed in improving the flavor and nutritive qualities of cultivated sorts of dandelions; why the leaves of dandelions growing side by side are often strikingly unlike; and to what extent the differences we now see in dandelions are results of what they or their ancestors at crucial moments chose to do in response to favoring opportunity. I have come to wonder how much the inner life of a dandelion is like mine, and what is the most important difference between us.

After many years I am still asking and wondering about dandelions and other commonest things that interested me deeply as a boy, and I can see no end to the joy of learning more and more about them. Living creatures have always interested me most; and the most satisfying of all the delights of studying them have come from the feeling that we are akin. I try to understand their needs, comparing them with my own; and try to appreciate their vital problems, rejoicing in the efficient ways they have found of meeting the exigencies of their lives.

I have enjoyed especially making friends with the plants about me, learning to recognize them when we meet, to know the names by which they are called, and to discover how we may be of service to one another. Some of the humblest among them, such as lichens, have by the example of their lives often led me to reflect on the advantages of co-operation, of profiting by opportunities neglected by others rather than working injury through competition, of patient waiting under adverse conditions, of substituting beauty for ugliness, and of contributing to higher achievement by others.

Surely we are all one—we sharers of the gift of life—alike inheritors and contributors, owing to those around us and those to come the best we can give for the good of all!

THE ATTRACTIONS OF NATURAL SCIENCE.

BY WILLIAM WHITMAN BAILEY, LL. D.,
BROWN UNIVERSITY.

I have ever maintained that, whatever else might be a man's regular vocation, he would find it to his advantage to study nature. Of course I am aware that there are many whose occupations are such that they can give very little time to any extra pursuit. But even to these, though it may be all too rarely, come a few spare hours. There are always the Sundays and holidays and the times, all too limited though they be, before or after the day's labor.

Those to whom the love of nature is inherent will find the time to recognize her and by reading, study and, above all, by observation to add to the sum of their knowledge. By this means, not only will they increase their own personal enjoyment, but will be able to instruct and entertain their friends. Many a man who has pursued botany, entomology or geology as a side issue has become famous in his day and generation. Some of these devotees, indeed, have been persons of humble calling.

Take the case of Robert Dick, the baker naturalist, a Scotch peasant who became the correspondent of such men as Sir Roderick Murchisson, and to whose quick eye science was indebted for the discovery in Great Britain of many a rare plant or fossil. He himself says somewhere, and it seems to me the key to his character, that when walking on the sea-beach, he filled his pockets with the glistening pebbles "Simply because they were so bonny." Herein speaks true nature love. It is, of course, conceivable that one may learn much by a continued pursuit of a subject—that he may run it down or capture it by desperate effort. But Nature is proverbially coy; to be won, she must be wooed; and he is happy, indeed, who has, as it were, inherited her affection.

I think perhaps I can enforce my point by a note of personal experience. My father was a noted naturalist, his side pursuits being botany and microscopy, while his regular professorship at

West Point was that of chemistry, mineralogy and geology. Of course I cannot absolutely refer my own tendencies to heredity, but as two brothers manifested the same, there surely is presumptive evidence. When, however, only nine years old, I was left entirely under my father's care and became the constant companion of his shorter walks, I have never known a more loving student of



WILLIAM WHITMAN BAILEY, LL. D.
Member of The Agassiz Association Council.

nature or one with a brain better stored with varied information. To this, old West Point graduates tell me, and I can assert myself, he added a marvellous gift of instruction. "Sermons in Stones" were by him made as interesting as a romance. Poetic expression clothed his every thought. No object was too small or mean for his attention. I recall once, when a lad, on one of our walks, his picking up a pebble and explaining to me that it had come from the Shawangunk Mountains, quite far from West Point. He told me how there the same stone was found *in situ*, while with us it was only as a pebble. This led to the whole story of the ancient glaciers.

As a result of this early training and association, I entered life with a strong love of nature. Many essential facts, which others have to acquire, seem to me to have been mine always. Finding ever such intense joy in mountains, woods and sea; constantly desiring to learn more about the denizens of these regions, their relations and habits, I have found increasing delight in imparting to others such information as I have myself acquired. I have repeatedly pointed out to my students how well it is to have a hobby, and how some one of the nature studies is especially desirable.

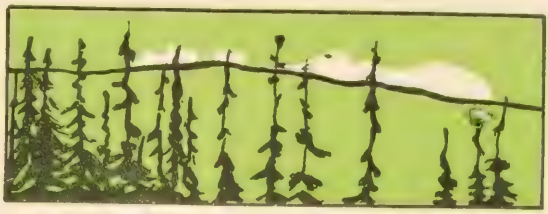
A walk for mere health purposes may degenerate into a constitutional and become a bore; if taken as an excursion in which one has certain aims in view, or at least, expectations, it is translated into a joy. Many a student, including the President of Brown University, has told me that it was in the department of botany that, as they expressed it, "the scales first fell from their eyes," and for the first time they saw as it is the wondrous face of nature. Several students of divinity I can recall, who confessedly taking up botany for the acquirement of texts, of figures, of comparisons, have been led to a wider and a more telling study. The minister, indeed, may make botany a delightful companion, especially in a country parish. It is not at all surprising then to find many of them accurate and enthusiastic observers.

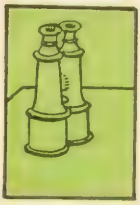
To the botanist there are not only the field joys inherent to spring and summer, but delightful closet labors in winter. In such hours,, in his cosy study or library, he either examines anew his microscopic specimens, or unfolding his herbarium, studies, arranges and mounts his dry material. Next to the pleasure of the fields, the association with living things, there is no greater joy than that to be found in one's cabinet. Each plant recalls some place or event, or it may be, brings back the face of the loved and lost. In a certain sense, then, the herbal is a diary, and one relives with a specimen, perhaps grown on some high mountain top, the transcendent moment of its collection.

I say then, in closing, to all my readers, I warmly advise the study of nature, for the joy of acquisition in part, but more for that love of the beautiful and true that will grow with the years.

AN ILLUSTRATED MONTHLY MAGAZINE FOR ADULTS. DEVOTED TO COMMONPLACE NATURE WITH UNCOMMON INTEREST.









THE GUIDE TO NATURE

Stamford, Conn.
Edward F. Bigelow, Editor.

Vol. I AUGUST, 1908 No. 5

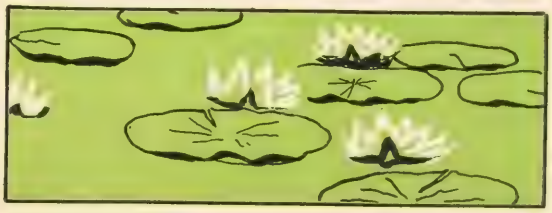


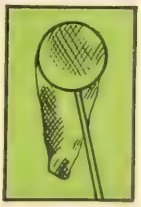












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"TO DESCEND THE STONE STEPS TO THE WATER'S EDGE WAS AN EASY JOURNEY. SEE PAGE 157.



CONES OF THE RED PINE (PINUS RESINOSA) PICKED UP IN THE ROAD TO THE ESTATE DESCRIBED IN THE FOLLOWING ARTICLE.

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I AUGUST, 1908 No. 5



Nature in Decoration and Pleasurable Resource.

(STUDIES ON A FINE ESTATE)

BY EDWARD F. BIGELOW, STAMFORD, CONNECTICUT



HAT nature does in some of her aspects need improvement is self-evident. Wonderful as is the human eye, the skilled optician might improve it. Delightful and picturesque as is the tangled thicket that pushes itself close to the gutter of a country road, it would not be well to allow the hedge to advance so far as to destroy the utilitarian drain. Here it becomes a contest between beauty and service, and in this particular case, beauty must be sacrificed. Yet it is possible to be too eager in behalf of the strictly useful. Sometimes it occurs that the utilitarian may be as serviceable and as sanitary after it has been made beautiful as it was when it was ugly as well as healthful. There is often a happy medium, but in nine instances out of ten that happiness is overlooked, deliberately omitted or intentionally obscured. Beauty as well as sanitary service has an educational value, but as ugliness is usually attained with less effort and less muscular fatigue, not to say with less mental wear and tear, we bury the beautiful with our spade and shovel, leaving the ugly in conspicuous heaps and piles and irregular mounds of gravel.

The unskilled optician and the inexperienced road trimmer each makes a bad job of his special work. Too often injury occurs where improvement was intended. In many attempts to im-

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prove nature the most frequent error consists in substituting formalism for the naturally picturesque.

Near my former home there at one time existed a natural Eden of charming beauty. An entering wood path led the lover of nature away from the main and sunny road along a hillside to an umbrageous forest, a wild tangle of natural beauty. It was in every respect a charming situation with an alluring and indescribable environment.

But soon appeared a sign, "Building Lots for Sale." The march of "improvement" was advancing in that direction. The surveyor sighted his instrument and drove stakes. The sound of exploding dynamite was heard in the land. A house was erected and more are to follow. Grades have been "improved." The landscape has been "cultivated." The "landscape gardener" has sent in his bill and departed to make havoc elsewhere. The region has been "beautified." I am thankful when I remember that the sky remains and that the clouds have not been "cultivated" nor "improved." The brook has been diverted and now actuates an hydraulic ram, but who am I that I should criticise? Cleon owns the ground, he says, and Cleon wants me to look at it through his spectacles but my eyes are not adapted to Cleon's lenses.

Rapidly the little paradise has become a thing of the past. A bank made picturesque by overhanging vines and a sumach thicket has been transformed to a harsh wall of broken stone with severe and angular outline. Cleon



"BUT WITH ALL ITS WILDNESS AND GRACEFULLY UNKEMPT APPEARANCE, ONE FELT INSTINCTIVELY THAT IT WAS CARED FOR—MORE APPRECIATIVELY THAN ANY OTHER PART OF THE PREMISES." See Page 156.



"EVEN THE TREES WERE PERMEATED WITH A QUIET SIMPLICITY AND AN UNOSTENTATIOUS YET CORDIAL WELCOME."

is torturing everything into straight lines. He has indeed "improved" the place. A great opportunity for one of the most picturesque little settlements of homes has been lost. It would cost thousands of dollars to undo what has cost as much to do. Imagine the original cart path transformed into a firm driveway, with the effacement of the rustic stone walls and the natural borders of shrubbery and vines. Let down in various places buildings in a rustic architecture to harmonize with the environment. Close your eyes and imag-



THE ROSE ARCHES IN THE FORMAL GARDEN.

ine all this almost in the heart of a city, and you will readily perceive what an offensive thing to a lover of nature is this so-called improvement, as usually practised. And yet, to look from the other point of view, there must be improvement. Delightfully beautiful as is some abandoned farm or old homestead back in the country, much as we may admire the neglected rusticity and informal tangle of things in general, even the most enthusiastic admirer of natural beauty feels that some improvements must be made. Otherwise the region would not be habitable. A human being should be civilized; he should be unwilling to live like a wild animal. Yet even our civilized nature retains the call of the wild. It is evident that there should be an improvement on nature, but not annihilation. To what extent and by what methods, is the problem. In a drive or walk through the country, one who is an observer as well as a lover of nature and of civilization may see all grades of "the extent and the how." A hovel or a palace or any grade between will show it. The problem is not how much or how small are one's possessions, but how well are those possessions used. A close observer may see here and there a hut whose occupant knows how tastefully to mingle the artificial and the natural. It takes only a background of shrubbery and a few garden beds and a border of flowers to show it all. Then one often sees "magnificent" estates that should be moved so that the North Pole might be in the center—so icily formal is everything. The owner may fancy that he has a country residence, but he is mistaken. He has an enlarged section of a Fifth Avenue sidewalk. There is a real cause for worry when one walks through a forest and hasn't entered it, or when one travels for ten miles on a country road and hasn't been on the road.



THIS WELL KEPT GARDEN SUGGESTED TO THE OWNER THAT A GARDEN OF WEEDS WOULD ALSO BE BEAUTIFUL.

I should think it would be a great trial for some owners of country estates when they discover that they have not



A CURVE DECORATION OF ROSES.

yet left the city. The country, the roadsides, the fields, the forests are not localities; they are conditions of mind. The environments are mental X rays whereby we can see the cerebral, not to say the astral, state of the owner.

* * * * * *

I have seen a country estate that thoroughly savored of the country and yet was well kept. It was spacious yet cozy. It was magnificent yet simple. Even the trees were permeated with a quiet simplicity and an unostentatious yet cordial welcome. At one side of the house, cows were grazing in the rustic simplicity of our forefather's

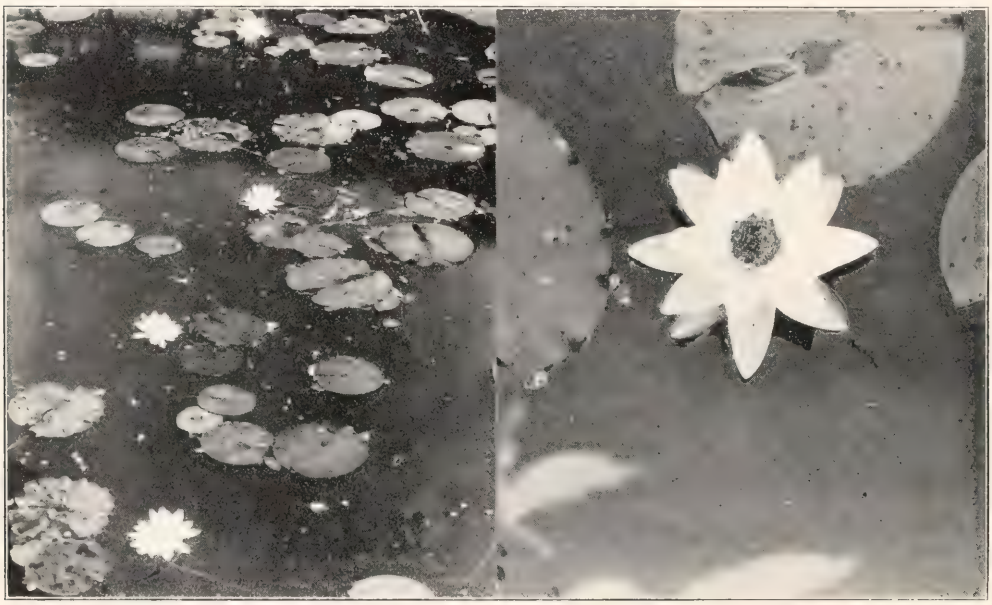


NATURE IN DECORATION OF A GARDEN WALL.
Observe the informal formalism.

days, while across the road was a modern garage filled with elaborate "machines." The persistent action of lawn mowers gave certain parts of the premises the neat appearance of a man who shaves every day. At the other side of the dwelling was a tangled and enticing profusion of trees, shrubs, native plants and grasses that would urge a nature study class into the hysterics of ecstacy. The Indians that centuries ago roamed the hill enjoyed no more of the primeval wildness. It was delicious, in its tangled profusion it was ravishing.

fuss with me so much; let me alone; I can do my best only when unhampered."

Why this territory was so guarded and had so beautiful an appearance I could better understand when later I walked with its owner through his elaborately formal garden. He said, "Yes, this is beautiful as you say, but I should like to make another with nothing in it but weeds." I must confess, plant lover as I am, that this was a new idea. Abstractly and with the enthusiasm of a botanist, I had often lauded the beauty of weeds—but never from the horticultural point of view. A



"THE WHITE POND LILLIES BLOOMED IN A POND OF FRESH WATER."

"Their pads floated to and fro as naturally as over the ooze of a muddy pond in the swamp."

This decoration of nature in the wild dared approach even to the vines that overhung the edge of the road and the steps leading to the house. But with all its wildness and gracefully unkempt appearance, one felt instinctively that it was cared for—more tenderly, more appreciatively than any other part of the premises. It was care not only loving but that most appreciated by nature—that of being guided yet practically let alone. Both nature and man have individual rights. If Nature could speak, as this magazine can speak for her, she would say, 'Don't

garden for weeds! The very words seem to be antagonistic. I had known of weeds left in many a garden through shiftlessness or a lack of time to remove them, but a garden deliberately devoted to weeds! I had never before known my farming tastes and my botanical enthusiasms to come so seriously into conflict. I had been content to let them travel along side by side—but always, mind you, with a mental high board fence between. It may shock, it may cause a clash, but sometimes it does



"TRANSPORTED TO THE LAND OF THE GONDOLIER."

"The ornamental prows have floated away."

one good to pull down a panel or two and to make easier the approach from one mental field into another. It is often beneficial to turn different cerebral fields into one.

Yes, the formal garden was beautiful but always in improved naturalness. Not a part of it seemed a pergola extension. Even the inviting seat under the chestnut tree was rustic. Near by the white pond lillies bloomed in a pond of fresh water with a central over bubbling and spraying fountain and their pads floated to and fro as naturally as over the ooze of a muddy pond in the swamp.

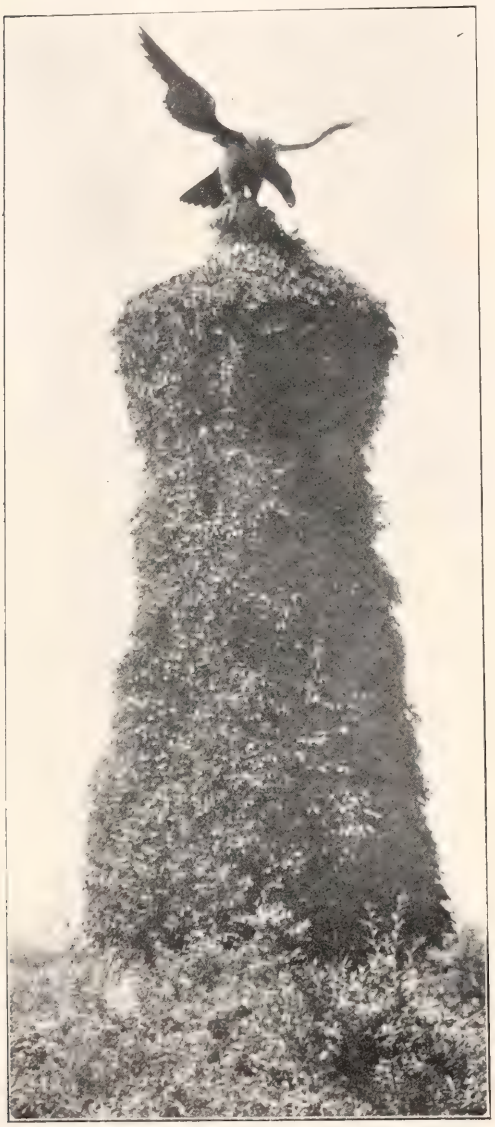
In the front of the house, at the salt water lake, one was transported to the land of the gondolier, but it seemed as if in a dream. The ornamental prows have floated away leaving modern canoes and batteaus rich in their polished natural wood. The prows! Oh, yes, these had grown more slender and had become vivified in the form of moving swans, and with truly poetic grace they floated in every direction above the limpid depths. They had attendants, too—as they have in dreamland—big ducks and little ducks and geese in various shapes and sizes. The broad stretch of marsh which for ages had been abandoned to mosquitoes had become an excellent example of nature under real and commendable improvement. This now bore many kinds of aquatic fowl. Some of those were of species not usually regarded as marine, but these too took to the salt water as if that had for generations been their especial preference.

In the distance was an island, readily reached by a boat ready for instant use. To descend the stone steps to the



"FORM OF MOVING SWANS WITH TRULY POETIC GRACE."

water's edge was an easy journey; to throw off the line and ply the oars, equally easy. Even from a distance the island proclaimed itself an island of birds. The ivy mantled tower with a



"THE IVY MANTLED TOWER WITH A BRONZE BIRD POISED ON THE SUMMIT TOLD THE STORY."

bronze bird poised on the summit told the story. Like the totem poles of Alaska that say, "This is the Bear Family," "This the Wolf Family," this totem tower said, "This belongs to the Bird Family." The purpose was respected. The entire island was not only "sacred" to the birds, but it offered a pungent warning against wandering footsteps that, amid vines and lush herbage, might come in contact with an egg ready to explode and to fill the air with odors quite unlike those of "Araby the blest." The visitor needed no sign, "Be careful. Birds' eggs are plentiful."

The conditions reminded me of the story of an Englishman who was showing a guest about his garden. The guest walked into a tank whose surface was concealed by a growth of aquatic plants. As he came up spluttering and making frantic efforts to free himself from the clinging vines and leaves, his mortified host was shouting, "Oh, I meant to have told you about that. Oh, why was I so careless?"

"N-n-v-r mind—whuff—and—fhss—saved—wh-on ghhh—you the trouble. I found it."

Nobody needed to tell me where were the nests of ducks and geese and swans. I found them; that is, mostly—occasionally one found me! But I never felt that I had done actual damage. The goods were too damaged and too shop worn to be saleable.

But the nests, the real up to date nests, with not the stray egg that didn't hatch! What beauties they were! To discover one had all the charm of the discovery of a wild bird's nest. But for that matter, these birds were wild enough, especially in the presence of a stranger carrying a mysterious camera. Those most suspicious of the intruder were the really wild birds that nested in great numbers in the ivy. These kept up a constant nervous fluttering to and fro as I approached the tower and their cries plainly said, "Go away."

On repeated visits the birds came to know me better, especially so when I accompanied the man who fed them. He poured the cracked corn into the water. The long necks should still be of use as in native haunts. He whistled and from far away came the birds—short necked, long necked, white, black, grey, little, big, medium, all sorts of birds. The feeding beach was the "common water" on which all kinds and



THE HUGE NEST AND EGGS OF A SWAN.

conditions of life met with a common interest in cracked corn. This was the long and short of it, but they nearly all assumed the same perpendicularity. The swans, however, floated in grandly toward the shore, and gracefully bent down their arching necks, except when they bent them outward to make a grab at some duck or goose that ventured too near.

Mike suggested that I get a moving picture machine and try it. I had only an ordinary camera. Whether it was his suggestion or the attractiveness of the scene I do not know. I do know, however, that I forgot myself (and the cost



A NEAR VIEW OF THE NEST OF A DUCK.

These eggs are much smaller than those of the swan. The nearness of the camera makes them seem larger



"MIKE SUGGESTED THAT I GET A MOVING PICTURE MACHINE."

of plates) and "loaded" and "fired" that Premo camera with as much activity as if it were a moving picture machine. The scene was exciting. I had been working for several days with a focal plane shutter, telephoto and all sorts of "fixin's" with not the best results. And here were multitudes of birds right on the beach, hustling in all sorts of attitudes for the grain. I was in the food house with Zeiss Protar long focus sticking out the narrow opening in the door, "firing" with gatling gun rapidity.

Mike was a faithful and admiring supporter. He enjoyed as I did the flashing pictures on the ground glass. (It was so dark in the house that no dark cloth was needed.)

It was exciting. I felt as brave as if the estate were being attacked and the repulsion of the enemy depended wholly upon a single gun in my hands. No



"IT WAS EXCITING. I FELT AS BRAVE AS IF THE ESTATE WERE BEING ATTACKED."

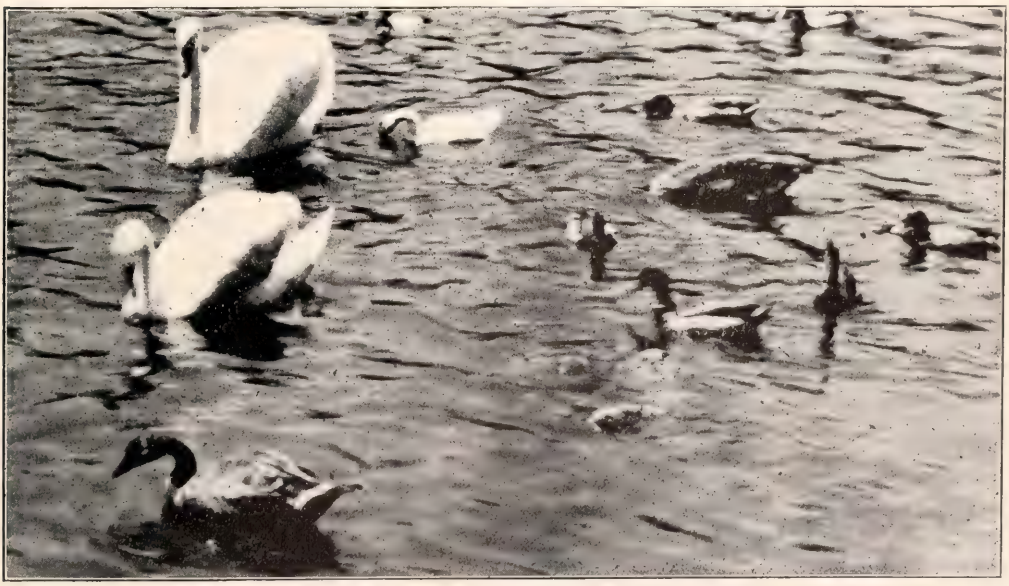


"THE SWANS, HOWEVER, FLOATED IN GRANDLY TOWARD THE SHORE AND GRACEFULLY BENT DOWN THEIR ARCHING NECKS."

hero could have done better. I fired every shot effectively. Mike, be it to his everlasting credit, stood by me to the last and handed me the holders, and as he offered the final one he said regretfully, "Haven't you any more in that case yonder?"

"Not one," I said with a feeling of pride in having done my duty, and to myself, as regretfully as he—perhaps more so, for reasons, as I gazed at that pile of twelve double holders and thought how much orthonon plates cost a dozen and how much it costs to develop them, "I wish I hadn't as many!"

Mike may have felt a little disappointed but I was sure I had "movin' pictures!"



"BUT I HAD ONLY AN ORDINARY CAMERA."

With which to study characteristic attitudes.

A few from that interesting collection accompany this article.

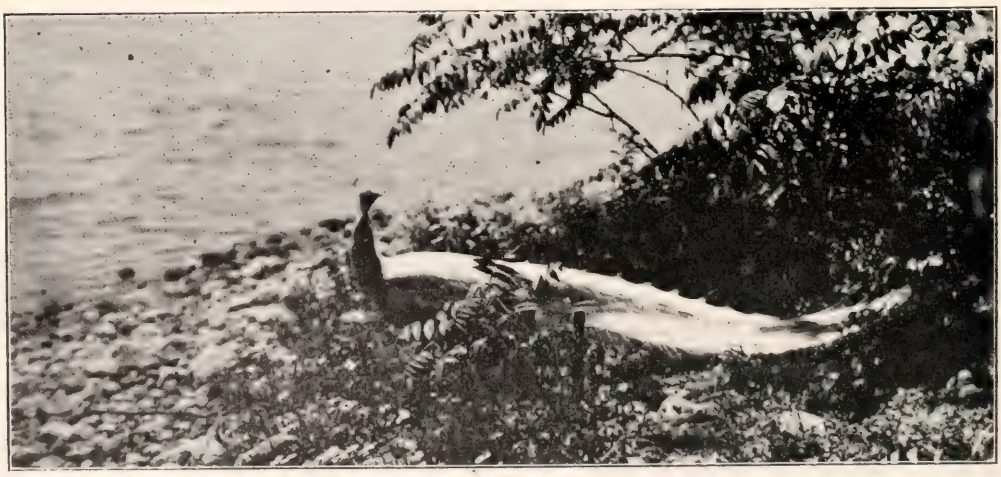
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The peacocks, strange to say, were the most difficult to photograph. In the first place, it was not easy to get near three of them and, secondly, they kept mostly in the dense shadows. The third manifested a queer combination of wildness, tameness and ugly curiosity. He reminded me of the patience and task work needed in photographing school children. Seat them on the ground and all are so anxious to get in the front row, there is so much "hitching up," that they get so near as to be out of focus. So I would set up my camera at about twenty feet. I would open the lens and put up the dark cloth. There he is now. No, he isn't. Where has he gone? Off with the cloth—hold on, hold on. There goes my camera. He has come up to inspect it and the camerist and has struck the tripod. I could not make him keep at proper distance. He was altogether too familiar. I was told that he followed certain ladies of the household in their walks and had even carried his curiosity to such an extent that he flew to their heads and made close inspection of the millinery. I did succeed once in "shooing" him to the twenty feet distance and in securing a fairly good photograph as he walked to the edge of the water. The others I could secure only by telephoto in the early morning when they sat statue-like on the fence. I wished, however, that the statue-like characteristic would have applied a little more to their heads, especially on a five second exposure.

* * * * * *

I have wandered around these beautiful premises, utilizing with much advantage and pleasure the privileges of the life studies and indulging in many observations of the delightful mingling of the natural with the artificial. The fact that the two can be mingled, in a magnificent and luxurious manner, is a lesson that should be learned by many wealthy people. One needs but to turn over some of the sumptuous pages of magazines devoted to the description of country life and of beautiful houses and gardens to feel that location and dollars alone cannot make a country nor beauty nor even a home.

Envy no one. The naturalist is the wealthiest of all. He alone owns the whole world and has myriads to take care of it for him. He assumes possession of whatever portion of the property on which he may happen to be. Again, the naturalist learns the lesson of individual freedom. The scarlet tanager has the same right to gaudily see the topmost things of the tree that the earthworm has to bore subterranean tunnels. And who shall say which is the higher? What right has the zenith to claim more



"A FAIRLY GOOD PHOTOGRAPH AS HE WALKED TO THE EDGE OF THE WATER."



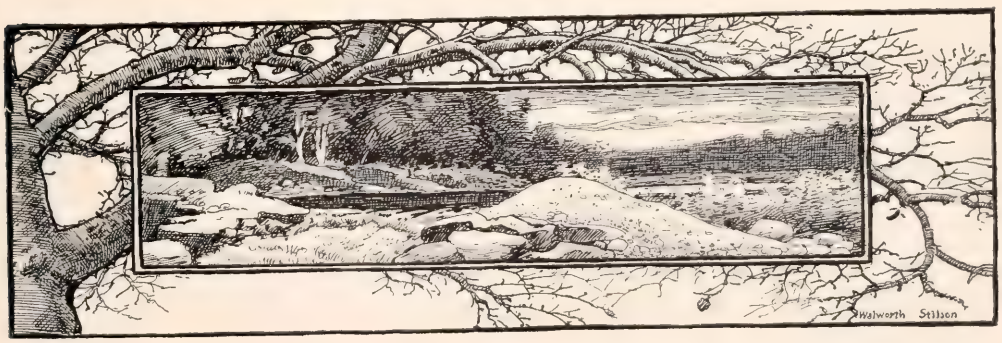
"I WISHED, HOWEVER, THAT THE STATUE-LIKE CHARACTERISTIC WOULD HAVE APPLIED A LITTLE MORE TO THEIR HEADS."

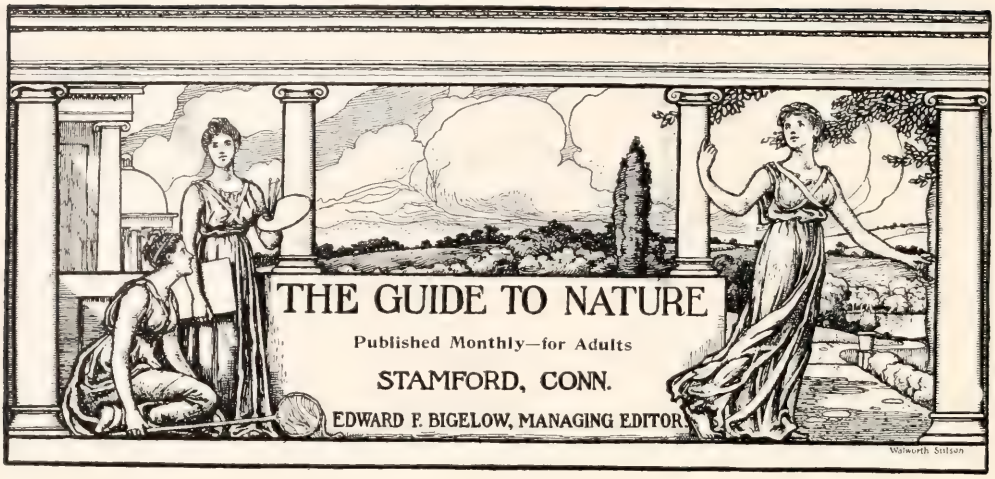
than the nadir? From the nadir's point of view the earthworm is the "highest." But pardon this bit of soliloquy. The point I want to make is be honest in using the English language. If you have "country," "beauty" and a "home," as in this particular instance, call it so. If you have coldness in architecture or in grounds, if you have artificiality in the exclusive extreme, if you have a palace, call it so. But to most human beings who live the natural and the improved in nature let there be the proper intermingling.

But, says some one, not all have the means to use nature so extensively as a decoration and a resource. The answer is that the plea is not for quantity but quality; not for ownership but interest.

If you love waterfowl get some ducks and geese and keep them in the frog pond. If you cannot get several get one duck or one goose. If you havn't the frog pond and really want one, move where there is one. If you cannot have a cement fountain, sink a half barrel in the ground of the back yard.

In other words, use nature as a decoration and as a pleasurable resource. Rightfully used, be your estate large or small, there is nothing more beautiful, nothing more helpful, than nature properly trained, properly restrained and properly, which means tenderly, led along on the way which she would, if left to herself, select her own path and freely fling abroad all her native beauty.





WHAT IT MEANS.

At the top of the cover on the first few issues of THE GUIDE TO NATURE has been printed this descriptive title: "An illustrated Monthly Magazine for Adults, devoted to Commonplace Nature with Uncommon Interest." The first four words have been, so far as we have observed or heard, perfectly clear to all, but there has been much misunderstanding of the rest. This magazine is edited in the firm belief that nature is as interesting to the adult as to the child, and that when we have completed our school days, we have not learned all there is to be learned from the natural objects of the world.

The modern pedagogical term "nature study" notwithstanding all the good it has done, has also done one great injury. That is, it has made and deepened the impression in not a few minds that nature study consists only of a few simple things explained in a simple way to children.

The term nature, as viewed by THE GUIDE TO NATURE, is not peas, beans, tadpoles, and bluebirds for the young folks, but is mountains, rivers, lakes, camps, trees, rides, walks, home surroundings, in a word, everything in the great outdoor world that may refresh or instruct any man or any woman.

"We will look to the hills whence cometh our help," was not meant to be limited to kindergarten rambles.

A lady canvassing for subscriptions to THE GUIDE was told by a middle-aged and apparently cultured man that he didn't need THE GUIDE, because he had studied botany and zoology when he was a school boy, under the best teachers, and he had learned all that he needed to know!

I, too have studied a little, and I have no fault to find with any of my teachers, but the more I have studied, especially in later years, the more have I realized how little I actually know of nature and how vast is the field. May I get off the earth long before I come to a state of mind, if such a thing be possible, when I shall no longer have an intense craving for more knowledge. And I am unable to picture to myself any future existence worth having where there shall be no opportunity for mental expansion and growth. Much as I love paleontology as one form of nature study, I can but add another petition to the Litany. "Lord prevent me from becoming a fossil."

THE ENCHANTMENT OF DISTANCE.

To those who love and study nature, it seems almost incredible that others do not have the same zeal and enthusiasm. We can but exclaim: Why, what else are we here for but to appreciate the fact that we are here, and to make the most of the environment. Even a love and interest in one's fellow beings is but appreciation of one of the many products of nature.

But even against all probabilities, the fact exists that the interest in nature is far from universal. Occasionally one

meets people who might as well be in another world so far as any appreciation of this is in evidence.

Then, too, in the realms of nature literature, and of nature in education, the support is far from what it should be.

The more I have considered this lack, the more I have tried to formulate a solution to the problem, the more I am inclined to believe, that the common saying "Distance lends enchantment to the view," contains a truth on which rests most of the lack of popular and even esoteric interest. With the populace as well as with the select club, there seems to be a feeling that this thing near at hand isn't worth considering. There is undoubtedly a popular interest in animals, as witness the money-drawing power of the menagerie of foreign animals generally connected with the travelling circus, in the extended sale of certain books describing animals that live in distant countries, and in the Munchausen newspaper stories of some new bear from Alaska, or a 1,000 year old toad found alive and well in a rock from a Nevada mine.

How attractive and popular seems the distant time. The route of the Anabasis is regarded as of more vital interest than a path through the neighboring woods, and the dates in the life of Louis Somebody of France more cultural than the metamorphoses of an insect in the nearest field.

Take for example the curriculum of any school and observe the undue attention given to events of the distant past in comparison with that devoted to imparting a knowledge of the commonplace things of to-day.

Take, again, the programme for the year's lecture course of any woman's club and observe those on the "Whichness of the What," compared with those on "What is this that I Have Seen?"

Think of it carefully. Do you, whether you are a naturalist or not, know any more astounding fact than this, that so many hours and so much appreciation are given to the distant in time and place and so little attention to the denizens of one's own dooryard, or the neighboring field? There is a principle involved in the familiar quotation, "Distance lends enchantment to the view" that should have infused into it, that embodied in another equally trite and time-honored saying, "Charity begins at home." I suppose this word charity means love, but it may also mean education and life.

THE END.

I am a devoted reader and admirer of one of the high grade magazines devoted to the description of those lavish appliances with which the wealthy and yet busy man is supposed to restore the normal action of his nerves, when he flees to the suburbs to escape from the stress and storm and struggling competition of the "madding crowd." I read this magazine not so much from personal as from editorial interest. I like to see how that other editor strives to make attractive the "quiet" of the suburbs.

In a recent issue he publishes a masterpiece. The title is alliterative, euphonious and catchy—"Mice and Money." And the contributor goes on to tell in glowing terms how even in a small place one can make much money by raising and selling these small pets. This and other publications have honored me by allowing me to tell their readers how to make money on all sorts of things that I have in my backyard or have seen in others' backyards. These magazines stand then for ways and means,—how to get some money to use as a means for something else as an end to get more means.

Let it be known once and for all that THE GUIDE TO NATURE stands for the end not the means. This magazine believes in keeping mice, and advocates keeping mice if you have a liking for those little creatures, and it advocates any other kind of pet or any plant as an end in itself.

We do not care for an article on "How I Sent My Son to College on the Products of One Hen," and we have no yearning for an article on "The Astonishing Results of One Hundred and Forty-four Square Inches of Ground Devoted to Violets," and scintillating with $ $ $ and padded between the sparkles with tabulated columns of re-

ceipts and expenditures. We believe and stand for the end the satisfaction and pleasure in keeping mice or chickens or in raising violets; we believe in the suburbs and in the country as an end in themselves. As a resource of life, not as a source of dollars. If you are a specialist in raising anything exclusively for money, then, let us be frank, I believe there are class papers that will interest you more than will THE GUIDE TO NATURE. You may make your money at something else. We stand for the things that are loved and for the people that love them.

One of my favorite recreations is to go hunting in ponds and ditches for microscopic forms of life. The water is strained and the results of half a day's work may be carried in a few bottles in a three pint pail. This pail and contents, my strainer and dipper are a center of curiosity to the people on the trolley car on which I travel to and from my favorite collecting marshes. It seems especially difficult to understand how I can be a user of such things for the common question is "Can you sell 'em?" To these I have a stock answer, "No, sir; but I can buy them as I did these by a half day's hard work."

In other words I can be "the end." I never yet could understand why so many people seem to think that some one else can use such objects to better advantage than I can. No, I am "the end," and the things in the bottle are "the end," too. They are not a circulating medium with which to purchase something else.

And THE GUIDE TO NATURE stands, too, for the things you fancy, for the form of outdoor life that best pleases you.

Speaking of selling the contents of those mysterious bottles reminds me that almost every visitor to my pet-house in viewing the rabbits, cavies, etc., asks, "I suppose you make a lot of money in raising and selling these pets?" In fact I should be almost ashamed to tell how much of my salary I take in order to possess this little luxury. How honored I should feel if somebody should say, "I suppose you are capable of taking more pleasure with these than could any one else to whom you could sell them."

Then, also, of all this nature in the schools, I fear that too often nature is desecrated as a means to something supposedly better. Frequently real "nature study" does not please me because it is so correlated, so used as a form of apology or as a means for something else. Even that master, Professor Clifton F. Hodge, says, "Nature study is learning those things in nature that are best worth knowing to the end of doing those things that make life most worth living." His classic definition is admirable in many respects. It is euphonious and well balanced and contains much truth. But to me it seems that nature study is in itself "the end" as much as any doing that may arise therefrom.

And the mice and the things in the bottle or the pets in the hutches are really worth while.

And this world, good and beautiful in itself, is really worth making "the end." We can take our full one hundred per cent. here and let whatever else of good may come be above par and clear gain.

PANAMA MOSQUITOES.*

In order to determine the species and habits of the mosquitoes of Panama, and thereby to assist in the sanitary war against them as disease carriers, Mr. August Busck of the Department of Agriculture, was recently sent on a collecting and investigating trip to the Canal Zone. The material brought back by him has been studied and identified, and a full report showing ninety separate species known on the Isthmus is just published by the Smithsonian Institution in its series of "Miscellaneous Collections."

Inasmuch as each species of mosquito, besides being physically different in some respect from every other, has habits of its own, the necessity of knowing accurately and completely just what sorts of mosquitoes have to be coped with, is apparent. Some kinds breed exclusively in artificial receptacles of water such as tin cans and open vessels, others only in hollow places in trees, some in high

*Compiled from material furnished by the Smithsonian Institution.

vines that overgrow the trees, some limit their breeding to notches of bamboo stalks, and a number of varieties are satisfied only with crab holes in the ground. One of the species carries yellow fever, some spread malaria, and others are instrumental in carrying other diseases. On the other hand, a large number of species are entirely harmless, and several have no inclination to bite human beings.

Thus, aside from the pure contributions to knowledge resulting from the trip, this exploration has rendered possible more economic and efficient methods for exterminating the disease carriers.

Mr. Busck spent three months on the Isthmus during the breeding time, covering the end of the dry season and the early part of the rainy season, and secured larvæ of eighty-three species, of which thirty were new to science. With seven additional species already known, this constitutes the largest number recorded from any one locality on earth. Most of the material gathered has been deposited in the U. S. National Museum.

Mosquitoes do not fly far from the place where they are hatched. They keep close to their food supply. Those that affect the inhabitants of a town or camp, normally do not come from a distance greater than two hundred yards. It is this fact that renders the sanitary work of the Canal Commission possible.

SANITARY METHODS.

The land about every settlement is cleared by the removal of all brush, undergrowth, and grass; only shade trees and fruit trees are left, and these are thinned out to admit sunlight and free ventilation. When practicable, swamps and lowlands are filled in with some of the immense supply of material taken from the great Culebra cut. Then the whole area is drained so that the surface water will run off. Ditches and slow-flowing streams are kept clear of mosquitoes by drippings of oil or of copper sulphate. Swamps and pools are oiled at least once a week. Water barrels, buckets, and pails must be screened or oiled, and all tin cans must be buried. Even the old cast-off machines, brush-covered relics of French occupation, are drained of their puddles of water. If many insects infest a camp or town it is fumigated. By carrying out these methods of general extermination exceptionally thorough results have already been obtained.

Still greater efficiency may be secured, Mr. Busck believes, by turning to use additional scientific knowledge of the habits of special varieties of mosquitoes found on the Isthmus. The opportunities opened about the Canal for further enhancing man's knowledge of disease-preventing methods are peculiarly favorable, and a grasping of them makes for sanitary welfare not only in Panama, but in all the tropical countries of the earth.

YELLOW FEVER AND MALARIA MOSQUITOES

One important feat has already been accomplished. The yellow-fever mosquito, the only kind in America spreading this infection, scientifically called Stegomyia, is very scarce. It is possible to live for weeks on the Canal without seeing a single specimen. This mosquito is a strictly domestic animal, never found away from man. It breeds only in artificial receptacles, such as barrels, water-coolers, bottles, tin-cans, in and around human habitations. The authorities, knowing this, have it well within their power to eliminate absolutely this dangerous insect, and to render a yellow fever epidemic impossible on account of the total absence of the only agent that spreads it.

The malaria carrying varieties, included under the general name of Anopheles, are also subject to strenuous attack. Usually the species of this group deposit larvæ along the edges of slow-flowing streams and stagnant pools, but specimens were also secured from the bottom of an old boat, from an abandoned dump car, from holes in trees, and in similar out-of-the-way spots. It has not yet been determined whether all of these are instrumental in carrying malaria, and therefore they may furnish a fertile field for investigation.

Certain genera, technically called Megarhinus, Psorophora, and Iutzia, were found, which, instead of spreading any disease hostile to man, wage war on their weaker cousins and at times even on their brothers and sisters. Rather than exterminate mosquitoes of these habits, it might be well to cultivate them and to enlist them as allies of the sanitary authorities, were it not for the fact that some of them are exceptionally annoying biters of mankind.

CORRESPONDENCE AND INFORMATION

WILL ASSIST MICROSCOPISTS.

University of Colorado,
Boulder, Colorado.

To the Editor:—

I beg to acknowledge the receipt of the first four numbers of The Guide to Nature. The article by Professor Douglass in the July number gave me much pleasure and much reason to hope for a new era like that which Messrs. Nelson and Carpenter enjoyed.

It occurred to me that perhaps there are some members of the AA, particularly the younger ones, who would like sections cut or work of a similar nature done, but do not possess the required instruments. I am fortunate in possessing a microtome, etc., and have the use of the instruments belonging to the University. If these of whom I spoke will write me I will be pleased to help them all I can.

Very truly yours,
Wm. D. Fleming.

NOTE ON FOOD OF BLUE JAY.

New Castle, Indiana.

To the Editor:—

The occupants of a recently disturbed ant hill were excitedly crawling about the hill and the adjacent cement walk. They were large, and to a blue jay in a neighboring tree they must have looked luscious, for flying down, the jay began to pick them up with an eagerness that seemed to say that this was an opportunity that might come his way but once. As rapidly as he could do it he seized the ants, with each capture lifting a wing, sometimes one, sometimes the other, and seemed to deposit his prey amongst the feathers back of and underneath it. So quickly he worked and with such evident eagerness to make the most of this rare occasion that, as he lifted the wing, putting his bill amongst the feathers, it often seemed that he must loose his balance and topple over backwards. But he kept his poise, worked on with all speed and had laid in quite a store when a passerby frightened him from his task.

Whether this jay had only just discovered the most convenient of all storehouses for his use or whether this food was to be carried to the nest for the young, for it was nesting time, he was most interesting.

Grace Ellicott.

LIBRARY OF NATURE STUDY.

Brooklyn, N. Y.

To the Editor:

The work of the Children's School Farm in New York City, so attractively presented in the June number of The Guide to Nature, must appeal to all persons interested in the education and welfare of children. It forcibly shows that the School garden offers an inviting gateway to the Book of Nature, and therefore the progress and development of the "Children's School Farm League" in extending such wholesome influences will be watched with interest.

In connection with the subject of School Gardening, a selected, annotated list upon Nature Study recently prepared by the Children's Museum Library may be of interest to your readers. This list of seventy-five books was chosen from the collections of its own library at the request and with the co-operation of the Supervisor of Nature Study in the Vacation Schools of New York City. The books are divided into several groups entitled general nature study, school gardening, flowers and trees, animal life, and commercial products, being chosen especially as aids to teachers in inspiring a love for Nature, and in awakening interest and sympathy. While about one-third of the titles relate to "Gardening," a somewhat smaller number treats upon

"Animal Life," including the domestic animals, birds, reptiles, insects, etc., from the standpoint of becoming their friends rather than collectors. A few books upon commercial products were inserted so that the teachers in the vacation schools, or those having ungraded classes in public schools, may correlate bench-work, sewing, and other manual work with Nature Study.

A limited number of the Nature Study lists have been printed and will be furnished free to teachers and adults, upon application to the Children's Museum Library, Bedford Park, Brooklyn, N. Y.

Your readers may be interested to know further that the Children's Museum Library is in a way unique, for in addition to providing necessary books of reference for the museum staff, it acts as a school reference library, endeavors to supply information to the general public, and seeks to interest school children in the various subjects included in the scope of the Museum. The library contains at the present time about 5,500 volumes, with 1,800 books upon Nature Study, including the latest and best popular, well-illustrated books.

MIRIAM S. DRAPER,
Librarian.

THE CAMERA

A SUNSET PHOTOGRAPH.

BY L. G. GILLELAND, AYTON, ONTARIO.

The "Sunset" photograph was taken on the shores of Lake Huron among the Gagheto Islands, to illustrate the stanza from Tennyson's "In Memoriam," which reads as follows:



SUNSET ON LAKE HURON.
Photograph by L. J. Gilleland, Ayton, Ontario.

'Henceforth, wherever thou may'st roam,
My blessings, like a line of light,
Is on the waters day and night,
And like a beacon guards thee home."

LIVES NAKED OUT OF DOORS.

BY SILAS G. WRAY, PHOTOGRAPHER, GRAND JUNCTION, COLORADO.

Many years ago near Provo, Utah, an Indian boy was playing with a gun and shot his mother accidentally. It is the custom and belief of his tribe to pay penance or punish themselves for any offense or crime which they may commit. This Indian chose to spend thirty years, or as they term "thirty snows" lying perfectly nude exposed to elements without any protection whatever, at the end of which time he is supposed to get up and take his place in his tribe again.

It is said he has spent twenty-seven years or "snows" and according to this he will soon have served his time and will get up again. The photograph shows him and his brother, known as "Provo Dick." His brother "Provo Dick" is very wealthy and does not like to have his brother punishing himself, and carries blankets for him to use and put up a tent for him to sleep in, but he tears them up and will not use them. It will be seen in the picture that the tent is torn to pieces and the Indian blanket was only put on him for taking the picture.

"Provo Dick" says he has gone to feed his brother many times in the morning during the winter months when he had to chop his hair loose from the ground with a hatchet, where it has been frozen all night, before he could get up and eat breakfast.



PHOTOGRAPHIC STUDY OF AN INDIAN WHO HAS SLEPT OUT OF DOORS, WITHOUT CLOTHES, FOR TWENTY-SEVEN YEARS.

It is certainly a very peculiar freak of nature for a human being to live and endure the scorching sun of the desert through the summer and the frigid elements through the winter without a stitch of clothing on him for so many years. There is no animal that could endure such treatment for any length of time. Persons who have felt of his flesh say it is as thick and tough as a piece of sole leather.

This poor Indian believes he is pleasing "The Great Spirit" by punishing himself in this way.

His tribe, several years ago, became suspicious of him and decided to get rid of him, and took him a hundred miles or more away in the mountains

and left him thinking he would die, but, to their surprise, in a few days after they returned to their camp grounds, the poor old Indian returned to his same place where he had spent so many years to finish out his penance.

Many people in the West are very anxious to see if he lives through his self imposed sentence.

A noble specimen of Indian Chief, known as "Sam Archie" or "Chief Archie," called to see me in my studio, and when we showed him the photograph from which this engraving was made, and asked him what made the old Indian lie so long nude, he pointed to his head and grunted out, Ooh! heep Ingun no brains," meaning the old Indian was crazy.

Most Indians are very quiet and will talk only when they have to.



THE MOUNTAIN STREAM.
Photographic study by Miss Nellie Ewan.



ON A HOT, DROWSY DAY IN AUGUST.
Note good positions of cows and excellent depth of focus.

PHOTOGRAPHIC STUDY OF CROSS SECTIONS.

Fig. 1.—Apple Wood.—This cross section of a twig shows the characteristic features of a woody stem. There is rather a large central pith, surrounded by a thick woody cylinder, and this in turn by the cortex. Traversing the

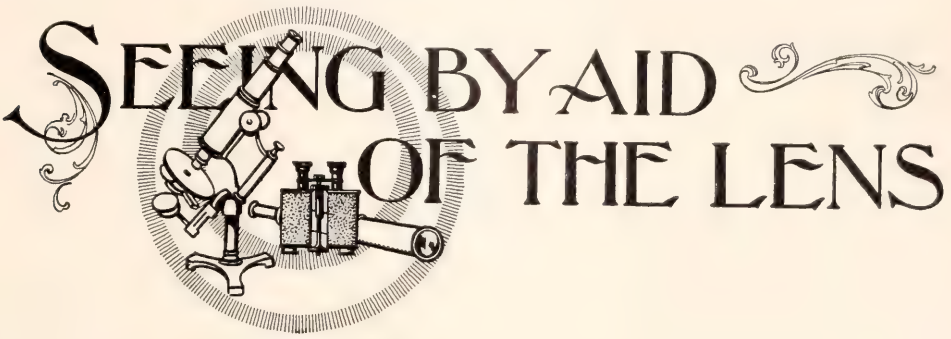


Fig. 2, APPLE ROOT.

Fig. 1, APPLE STEM.

wooden cylinder may be seen the "pith rays," the larger of which extend from pith to cortex. There may be seen also the "annual rings" of wood, indicating that this twig is four years old. The large open "vessels" of the wood are also very evident, and it must be remembered that through this wood tissue the water passes on its way from the roots to the leaves.

Fig. 2.—Apple Root.—This cross section of a root shows some of the differences between a root and a stem. The cortex in general is the same, but the woody cylinder is solid, with no display of a pith region. The so-called "pith rays" are very evident, and certain of the wood vessels are of larger calibre than in the stem. The most important difference between root and stem is not shown in this section, for there has been a large amount of secondary wood formation, making it resemble a stem more than does a very young root. J. M. C.



A CURIOUS MICROSCOPIC ANIMAL.

BY J. D. HYATT, NEW ROCHELLE, NEW YORK.

Pond life, with the amateur microscopist, is always a favorite object for study and investigation, and among the multitudinous forms of animals common in stagnant pools, one of the most curious is the Sun animalcule, so-called on account of the numerous slender rays that project from all parts of the body.

But there are two different sun animals, the one most commonly seen and described in handbooks being an extremely small creature measuring little more than the 2-1000 of an inch in diameter, while the one that I have been studying is comparatively, a monster, often measuring 2-100 of an inch, or ten times the diameter of the other; it is so large, indeed, that under the microscope with a 1-5 inch objective it will fill the whole field of view. This form, although remotely resembling the first, and found under similar conditions, belongs to a different genus, and is not so common as the other.

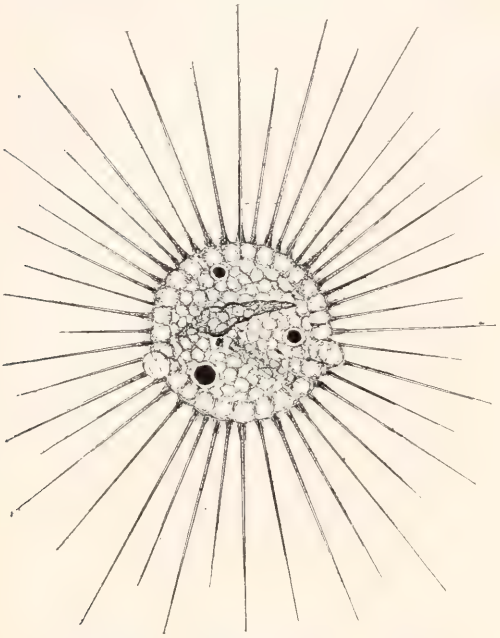
Having at one time secured a good collection of these "microscopically enormous" Suns, and observed their curious habits, especially their habit of gluttony, I became so much interested that I determined to cultivate my colony and discover if there is any limit to their ability to eat, "all the time."

But as some readers of THE GUIDE may not be familiar with the appearance of the Sun animal, it may be described as a globular body, consisting of a great number of protoplasmic vesicles, those of the peripheral layer being somewhat darker and much larger than those of the interior. The vesicles are hyaline, and therefore allow the contents of the body to be plainly seen.

Innumerable rays extend from the body in all directions. These are long, and taper to fine flexible threads towards their extremities. In the peripheral layer of vesicles are generally to be seen two contractile vesicles, at opposite poles. These are often considerably enlarged, and are frequently projected, and then collapse. They always reappear in the same place.

In the water of my collecting bottle containing my first gathering of suns, were also a great number of plants and infusorial animals consisting of rotifers, paramecia, and other ciliated or flagellated animalcules, together with diatoms, desmids and confervoid algae, but after

twenty-four hours, there was little left in the water but the suns. I therefore determined to ascertain the limit of its



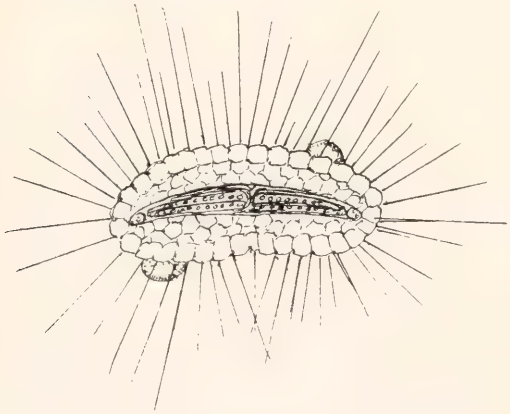
ORDINARY FORM OF SUN ANIMAL

Contains recently captured rotifer. The black spots are stomachs containing rotifers undergoing digestion.

voracity, but found that it absolutely had no limit.

To make this understood, I may explain its method of capturing and devouring a rotifer.

The sun seldom moves, but it is well



CHANGES SHAPE TO SWALLOW A CLOSTERIUM.

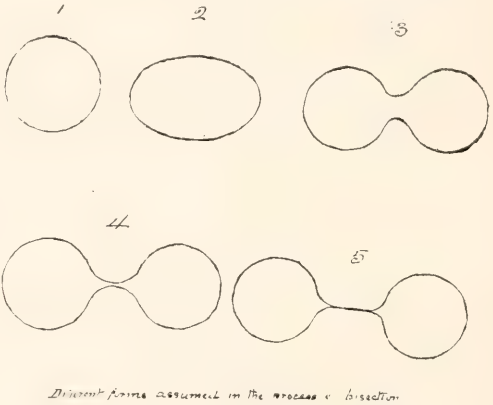
known the rotifer is an extremely restless little animal, and this activity often proves its destruction.

The rotifer then, rushing about, comes in contact with some of the sun's rays, with which it surely becomes entangled, and in its struggles to escape, only becomes more and more involved, until it is drawn near to the body, which then opens and takes it in.

The struggles of the rotifer, as it is gradually compressed, are curious to witness, its final effort to move consisting of an attempt to rotate the cilia around its mouth.

The rotifer is now in an extemporized stomach, and digestion proceeds with great rapidity, any indigestible portion of this, or of other food being ejected from any part of the sun's body that may be most convenient.

In my attempt to ascertain the limit

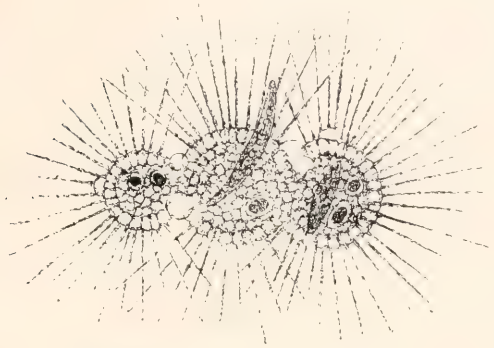


Different forms assumed in the process of bisection.

of the sun's ability to eat, I found some water that was swarming with Paramecia, and, pouring a part of this into my live-trough with the suns, I watched the results under the microscope. I soon found that, no matter how many I put in they were rapidly captured. In one of the suns I counted seventeen undergoing digestion. In this one, a change of form took place, and it assumed an elliptical shape. A constriction soon occurred in the middle, giving it a dumb-bell shape; the connecting link was then gradually drawn out, until it became simply one of the rays touching the point of one or the other sun. These rays then separated, and I had two suns about as large as the original one, and both eating all the time. In one case, I saw a sun separate into three, instead of two.

I found that the process of bisection occupied two hours' time.

As the suns multiply in this way, in a geometrical proportion, with a ratio of 2, it will be seen that their number may increase very rapidly, and I soon discovered that my first colony, consisting of



SEPARATING INTO THREE

perhaps a dozen had become many hundred at the end of the week.

I continued to feed my colony and kept them under frequent observation for four months.

Having fed a number of them on some of the green protococcus until they were full, I had some specimens of green sun animals, which might have been considered a different species by a person not acquainted with them.

It is interesting to see a sun put himself outside of a large desmid, a Closterium for example, whose length is greater than the sun's diameter. In such cases the sun will change the form of its body to suit that of the food.

The sun is not exclusively a flesh eater, but diatoms, desmids, or any other vegetable organisms are equally acceptable.

I omitted to mention the names of the two kinds of suns spoken of in the beginning, as I know that long technical names at the commencement of an article have a tendency to discourage the general reader, but the small sun mentioned first, is known as *Actinophrys sol,* and the larger one, here described, is called by the familiar name of *Actinosphaerium Ichhornii,* which I recommend every reader of "The Guide to Nature" who owns a microscope, to study.



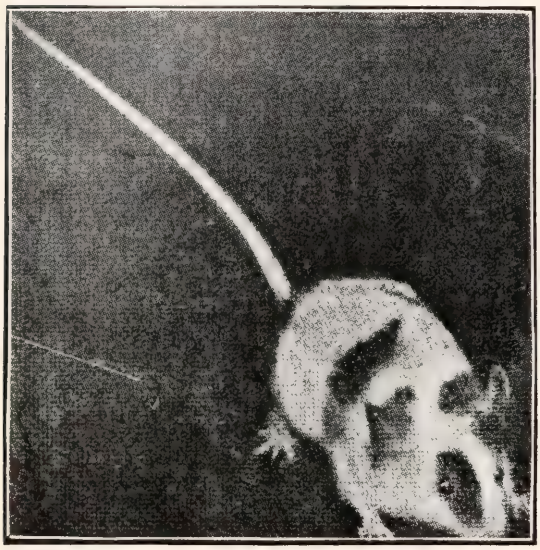
THE MOUSE FANCY.

BY H. L. WOOD, M. D., GROTON, CONNECTICUT.

(In the sudden death of Dr. Wood, The Guide to Nature loses one of its best friends, perhaps its very best for this department. He was an enthusiastic coworker and adviser in the establishment of this magazine. He made many valuable suggestions and was to be a regular staff writer, also an advertiser. Few fanciers had greater experience and knowledge of pet stock and all nature. He was a naturalist who could see nature study in a pet cat or mouse as well as in a wild animal. He was an intense specialist in his own department, but had a kindly cooperating interest in all others. A notification of his death reached our office a few days after the receipt of the manuscript of this article, and a letter telling of others of the series in preparation.—Editor.)

When one considers the primary objects of a fancy and is obliged to consider the factors of economy, time, space and labor, desiring to reach a given objective point in the fancy with the least possible expenditure of the aforementioned quartette of factors, he will find in the mouse fancy the *ne plus ultra* of his ambition. The primary object of a fancy be it dogs, cats, rabbits or mice, is the production of a strain as near as possible to a recognized ideal for that fancy, known as a standard. The reward for this effort, since little effort is without expectation of reward, is the coveted blue of the specialty show and recognition as an authority among the foremost in the fancy. In reality "it matters lit-

tle what one fancies, but how." One of the greatest fanciers of the day, Mr. Exelby, won fame all over Europe as an expert grower of certain flowers; as an example of the truth of this quotation



DR. WOOD REGARDED THIS MOUSE AS AN IDEAL TYPE.

referred to, Mr. Exelby for diversion took up breeding silver fawn rabbits with which his fame has equalled that of his exhibits of flowers.

The mouse fancy affords unequalled facilities to the fancier as a field of unlimited possibilities and one in which results are quickly obtained with a minimum of time, space, care, and expense.

During the year 1895, a few Englishmen organized what is still known as The Mouse Club, the purpose being to introduce to the public the desirability of the colored mouse as a fancy.

At this time practically all the known colors of fancy mice were albino, black, fawn, chocolate and the last three more or less broken with white. The results of the work of this club are evident in the great popularity of this fancy in England and the wide range of colors to which these fanciers breed this attractive little rodent, a list of which colors and markings would fill a quarter page. Some of the rare varieties are, however, worthy of special notice to illustrate the wonderful diversity of color obtainable. Among the more delicate and rare shades we have very pale cream, silver and its pale chinchilla tint, blue and tan, silver grey and tortoise-shell. It may safely be stated that there is not a color or variety of markings known to fur-bearing animals which has not or may not be produced in the colored mouse.

To this susceptibility to the color breeder's art is largely due the increasing popularity of the mouse fancy. Another feature which adds interest to the care of these little pets is expressed in the phrase, "there is something doing," all the time.

The fancier is not restricted as to the breeding season nor obliged to wait for months or even years to see the result of matings, while if he has erred in judgment in such matings the whole season's work is not lost thereby.

For breeding mice, a pen should consist of one buck and three does. Cages should be provided six by eight by twelve, best made of wood with sliding bottom and window opening in front hinged to a strip an inch and a half wide from the floor up; this prevents scattering nest material out of the cage. A tin pan for bread and a small glass dish for water constitute the house furnishings.

One daily feeding is all that is required, and should be of bread soaked in water to remove the yeast and then squeezed dry as possible, a little water in



ONE OF DR. WOOD'S FAVORITE SPECIMENS.

a cup and a teaspoonful of mixed hulled oats and canary seed per mouse.

Few fanciers use any nest box in the cages, as the female (doe) builds a very compact nest out of chewed bits of paper and grass, usually with an opening in the side like the nest of the oven

bird. The does carry their young from nineteen to twenty-one days and the layette ranges from two to twelve.

Mice are not usually particularly nervous, so it is possible to examine the young when desired without fear of the doe deserting or killing them as is common with rabbits.

At the age of three days the coat of young mice begins to show sufficiently so any undesired can be removed; these will be expeditiously cared for by a convenient house cat or relished by your hens as would be a feast of grasshoppers.

At five weeks of age young should be weaned and again sorted out, those not giving promise of quality being eliminated.

Here let me digress to say not only in breeding mice but in all varieties of stock there is no cruelty in humanity or necessary suffering associated with the instant transit of the vital spark as the result of a practical and unavoidable means of keeping a fancy within reasonable limits. I have no sympathy with those who for sentimental reasons allow valuable females to be ruined through breeding too frequently and rearing too large litters, or who "cannot destroy a living creature," yet will give them to thoughtless, irresponsible children to suffer starvation and torture.

Many a would-be fancier has his aspirations nipped in the bud by allowing his fancy to become a burden. Far better, and of greater value, are two or three choice young with strong parents than a dozen fair specimens and the vitality of the dam overtaxed.

Begin rightly, breed rightly, and you will end rightly, your fancy a pleasure and your stock a credit to your skill.

SOME INTERESTING OBSERVATIONS ON FROGS.

BY G. A. HINNEN, B. S., M. D.,
CINCINNATI, O.

No class of animals has received less attention at the hands of man than the reptiles and amphibians, and hence, no class is less understood nor has been persecuted more severely and persistently. This being so, frogs, lizards, snakes, toads, alligators, turtles, etc., have always proven especially interesting and have become a hobby with me, and many a word have I spoken in their behalf and defense. Their economic value has never been computed, and is enormous when one considers that a single poor, warty toad is worth almost $20 annually to the farmer, from the great and almost inconceivable number of insects he destroys.* Instead of being the "nasty slimy things" liable to "give you warts," etc., they are very interesting and deserve far more consideration and attention than they get. But it is not my desire to sing their praises nor extol their virtues now; this, some other time. I merely want to record a few interesting observations about frogs.

Among many pets I have had numerous frogs, and always enjoyed seeing them snapping up their food with almost lightning-like rapidity. In spring, when the first flies buzz lazily along the windows, I would take a frog on my hand and move him back and forth along the window, and every fly that came within reach was quickly gobbled up.

One time I noticed a frog in the vivarium who seemed suddenly to have grown very fat; on getting a front view of him the cause of his abnormal size was explained promptly. He had swallowed a crayfish as long as himself, and there was not enough room for this choice but tough morsel, so an inch of the crustacean protruded beyond the frog's mouth; gradually the crayfish disappeared as the anterior portions of same were digested, and within four days no more was visible. What makes this so remarkable was the fact that the crayfish was fully four inches in length and in perfect health; he was swallowed head foremost, i. e., the claws having been seized first. Aside from apparent discomfort to locomotion for three or four days, the frog seemed to have enjoyed his meal.

TUG OF WAR BETWEEN SNAKE AND FROG.

Another interesting episode occurred in the same vivarium at another time. There was a platform in it about six inches above the water, and on this platform rested a miniature tree with a rustic cottage high in its branches; this was the snake's roost. The room was very

*A. H. Kirkland, "The Habits, Food and Economic Values of the American Toad," (Bulletin 46, Hatch Experiment Station, Amherst, Mass.)

warm, and a garter snake made its appearance, despite the fact that it was mid-winter. For a little time about six or eight inches of the snake rested in the branches; then it dangled in mid-air, apparently intending to come down to drink or get some milk. About this time a big fat frog had come on to the platform from the water below; in a very few moments he had espied the snake suspended from the tree. In a trice and without warning he leapt into the air; his aim had been good, and an inch or two of the snake was in the frog's mouth. Having a good hold in the arboreal house, the snake pulled back; and the frog having an equally good hold on the snake with his little teeth, would not relinquish his grip, and so there he was, dangling and kicking in mid-air. A few inches of the snake would slip out of the house due to the weight of the frog, and then a renewed tug on the part of the snake would pull the frog off the tips of his toes, his long hind legs having in the meantime rested on the platform below. This novel and unusual struggle continued a few minutes until I could regain my composure sufficiently to liberate the poor snake and once more replace the frog on terra firma. The snake was twenty-four inches in length.

Another rescue occurred one day when I had placed a "newly formed frog," i. e., one who had just completed his metamorphosis in the aquarium from polly-wog to big frog, out into the pond where the veterans lived. I had turned my head but a moment, when the little fellow had disappeared; knowing the distance he could have jumped in that time, and a diligent search under the plants not revealing his whereabouts, I turned my attention to some big comfortable looking frogs near by; two tiny little legs and feet protruding from the mouth of one of these showed the possible fate of the little one. Needless to say the big one was made to disgorge his prey, and the little one was given a home which was safe from his cannabalistic relatives.



WE THREE RISE TO ASK THAT YOU GIVE US CAREFUL STUDY.

Note:—By the way, ever try to photograph a frog? If you have, you will appreciate the above.

AN "ILLUMINATED" FROG.

But the most interesting observation to my mind, and one I have never seen referred to in the literature were what we styled the "illuminated frogs." On dark nights we would exhibit them to our visitors from the city. Everybody would be told to catch fire-flies, or "lightning bugs," as they are designated here. These were then fed to the frogs, who snapped them up readily from our hands. As is their custom they do not bite or chew their food, so the poor hapless flies

were swallowed whole and alive. In their descent through the frogs' dark gastro-intestinal tract, they would illuminate the frogs at short intervals. While still in the frogs' heads the latters' large ears (tympanic membranes) would look like miniature lanterns; and then began the descent into the frogs' stomach. Again and again the insect would try to see whither it was bound and shed its ray of light, and the frog, fat, squat, and contented, would glow internally with satisfaction; the white abdomen and green sides looked most fantastic and picturesque.

Repeatedly I watched to see how long the fire-fly would live and light up its dreary abode, and a few figures may be of interest. One fly turned on its phosphorescent lamp but two times within five seconds; another sixteen times in forty-five seconds, and a third one eighteen times in one minute. The next observation recorded twenty-six illuminations within a space of one hundred and twenty seconds, or two minutes; another twenty-nine illuminations in one minute and fifty seconds; and the longest record consisted of forty illuminations in two minutes and forty-five seconds.

Appreciations.

I enclose my subscription to "The Guide to Nature" and welcome the child to my family circle. I hope it will be strong and healthy and a worthy relative of its predecessor, "The Observer."—Henry M. Brown.

Are we to have anything like "The Observer?" If so, I am sure "The Guide" will prove a success. I will speak of "The Guide" to my students and will place my copy in the Laboratory for them to use and create a love for it. Meanwhile I wish you all success.—Professor Alexander M. Kirsch.

LITERARY AND BIOGRAPHICAL

Lichenology for Beginners: By Frederick Leroy Sargent. Cambridge, Massachusetts: Harvard Co-operative Society.

This is an excellent book not only for the beginner, but for anyone as a convenient handbook. And more interesting to me than the mere fact of the lichens is the spirit of the author.

Methods in Moss Study in Twelve Lessons: By Charles J. Maynard, West Newton, Massachusetts: C. J. Maynard.

This book has grown out of practical lessons given by the author in moss study. While the author herein endeavors to teach his pupils the close observation of specific and other characters necessary for the identification of species, his aims reach higher than this, and, as will be seen, the mere identification of species is considered subordinate to the study of the life history of each moss, its habits and its relation to its environment.

Directory to the Birds of Eastern North America: Illustrated with many wood cuts and twenty plates drawn and engraved by the author. By Charles J. Maynard. West Newton, Massachusetts: C. J. Maynard.

This manual is intended to aid students in identifying birds in the field; hence external characters are chiefly used, and, as far as possible, those only which are conspicuous enough to be seen by the aid of a bird glass at a reasonable distance; while the author has endeavored to avoid using any characters not absolutely necessary for identification.

Characteristic habits and the manner of flight are mentioned; the song, and other notes and cries are also given.

Afield with the Seasons: By James Buckham. New York: Thomas Y. Crowell & Co. 1907.

A straightforward account of experiences such as are likely to occur to any painstaking observer who explores pretty thoroughly a somewhat restricted area. The field is one in which it is difficult for any writer to attain distinction.

Enlarged Edition of Webster's International Dictionary. 25,000 added words and phrases. Revised Gazetteer of the World. Revised Biographical Dictionary. Editor in Chief, W. T. Harris, Ph. D., LL. D. G. & C. Merriam Co., Publishers, Springfield, Mass.

This well known dictionary has been so frequently and so thoroughly revised as to be free from phases calling for unfavorable criticism. It is so generally acknowledged a standard as to need no eulogy of the reviewer.

The old book keeps young. It renews its vitality under the skillful guidance of the publishers. It is indispensable for school, office or study. In addition to "spelling and defining," it is a vast storehouse of general information. "Get the Best" is a phrase, permissible for the publishers to freely use.

Life of the Fields, the Open Air and Nature near London. By Richard Jefferies. 3 Volumes Cloth, Gilt Top. New York: Thomas Y. Crowell & Co., Publishers.

This is a dainty and charming set of three books by the Englisn author who is very dear to every naturalist. Poor, rich, patient, happy, sorrowing, Richard Jefferies! We are glad to have these little volumes in which we shall again revel in "The Pageant of Summer," "Meadow Thoughts," "Woodlands," "Flocks of Birds," and many other interesting and well written chapters.

The author does not speak didactically,—he just gives us himself. Such as I am, he unconsciously tells us he wants us to be. And we are. Every bit of philosophy, of nature and life, every little observation the gifted author weaves into the very life of the reader.

The publishers have done well their part in putting into so attractive form these classics from prose-poet (or shall we say poet-prose) of England.

Days Off and Other Digressions: . . By Henry Van Dyke. New York: Charles Scribner's Sons. 1908.

Professor Van Dyke is fortunate above the common lot of nature lovers, in having the means and the leisure to indulge his taste in woods and rivers in a fashion impossible to most of his readers. His readers are fortunate in that his extraordinary skill in handling words, gives to his pages a glamor and a charm hardly less than that of out-door nature itself. Professor Van Dyke is a master of literary craftsmanship. No one else writes his particular sort of book quite so well as he. Whenever, therefore, he comes to printing, the book is bound to be, of its kind, the book of the year.

The present work flits over a considerable range of topics. There are essays on the general theory of days off; on novels; on the art of stopping when one is through. There are three capital short stories of fisherman's luck, hunter's luck, and especially the luck of lovers. There are accounts of delightful excursions down wild and unfamiliar rivers in Maine, in out-of-the-way corners of England, and—of all places—in New Jersey. In addition, just by way of variety, there is a most amusing and satirical parody of the writings of the sympathetic school of nature lovers.

Professor Van Dyke, however, is first of all, the literary man, and next to that the fisherman, and only after these the naturalist. His latest work, is in his own words, a book of "pleasant and grateful memories, little pictures and stories . . . opinions and prejudices a book to symbolize and illustrate the true inwardness of the day off." It does not "try to prove anything, or convince anybody, or convey any profitable instruction"—and it is altogether charming.

E. T. Brewster.

Andover, Mass.

Leaf and Tendril: By John Burroughs. Boston: Houghton, Mifflin & Company.

The author records in this book some of his sharpest observations and most thoughtful speculations. He is at his best. The chapters, "The Art of Seeing Things" and "Animal and Plant Intelligence," are especially good. Among his sharpest observations are chimneys of cicadas, twining of plants, peculiarity of rays of light, not honeybees that puncture grapes, the human expressions of stone walls, the curious in nature, song of woodcock, anger at inanimate objects, the cow that ate a "stuffed" calf, frost forms and nature wins on both sides. The controversial chapter, "Gay Plumes and Dull," contains much food for thought even if the reader doesn't agree with him in all points.

Here are some characteristic thoughts from "The Divine Soil:"

"One of the hardest lessons we have to learn in this life, and one that many persons never learn, is to see the divine, the celestial, the pure, in the common, the near at hand—to see that heaven lies about us here in this world."

"All that which in our limited view of nature we call waste and delay—how can such terms apply to the Infinite? Can we ever speak truly of the Infinite in terms of the finite? To be sure, we have no other terms and can never have. Then let us be silent and—reverent."

The Common Objects of the Sea-Shore, Including Hints for an Aquarium. By Rev. J. G. Wood, M. A., F. L. S., etc. Author of the "Illustrated Natural History," etc. With illustrations by Sowerby. Fourteenth Edition. New York: E. P. Dutton & Co.

This little English work is popularly written and contains many good suggestions. Its chief fault is an endeavor to put too many subjects into one book. The common objects are too many to do justice to

in 200 pages,—especially so in view of the fact that the author includes marine birds, tides, etc.

The Game Mammals of the United States. By Major R. W. Shulfeldt, Medical Department of Army (retired), Corresponding Member Zoological Society, London, etc.

This work was completed by Doctor Shulfeldt during the autumn of 1907, and finding that he could make better terms for its publication in Europe than he could in America, he sought a foreign publisher. The work was at once accepted upon presentation, and is now being translated by Dr. E. E. Leonhardt into the German language. Dr. Leonhardt is in charge of the Department of Zoology of the Royal Zoological Museum at Dresden, and also editor of the widely known nature magazine "Natur und Haus." The latter commenced the publication of Dr. Shulfeldt's "Game Mammals" in parts last April, printing a part in every fortnightly issue of the magazine. When it has all thus appeared it will be re-issued (revised) in one large royal quarto volume of over 700 pages, and 100 half-tone engravings of the game mammals of North America, north of the Mexican boundary. A specimen illustration of the work is presented with this notice.

In the treatment of this subject the author has adopted the part scientific and part popular method. There is a general chapter on the Mammalia; and others on classification; geographical distribution; morphology, etc. Complete accounts are given of every game mammal in this country of every description, ranging all the way from the smallest squirrels to the heaviest game we have in the land. In undertaking the work, Dr. Shulfeldt brought to bear all his former experience as a naturalist in the field for many years, in the Smithsonian Institution, and the study of many private and public collections of mammals in various parts of the country. Practically his studies of the subject began over forty years ago and rarely has he lost sight of them.



RED SQUIRREL FROM LIFE.

Photograph by Dr. Shulfeldt. Specimen illustration of forthcoming volume on "The game mammals of the United States.

Birdcraft: A bird book of two hundred song,. game and water birds.) By Mabel Osgood Wright. New York: The Macmillan Company.

This is the seventh edition of this manual, (first issued eleven years ago,) of identification and description, by this famous ornithologist. The original illustrations by Louis Agassiz Fuertes, are unexcelled in modern bird drawings. In that class they are supreme, and need no belittling of bird photography to make them more so.

Doubtless, however, there is a needed word of caution, rather than mere "odious comparisons" in a part of what the author says of bird photography:

"Now books upon nearly every phase of bird life lie close at hand, both the result of compilation and of rich personal experience, while dry-plate photography has come to be the recorder of much that words cannot express."

"Those who use the camera must take care that by causing its eye to intrude and pry rather than swiftly glance and record, they do not even do more damage in a way than the gun that kills swiftly and is done. To be really useful, bird photography must penetrate the leafage that hides the nest and brood unperceived by its object, even as the rays of sunlight themselves penetrate the shade. To my thinking the latest method of rearranging the nesting haunts to suit the photographer and forcing the bird to perform many domestic functions in public, or else leave its brood, is without excuse, and this work lacks both scientific and artistic value."

"Four Seasons in the Garden:" By Eben E. Rexford. Philadelphia: J. B. Lippincott and Company.

This is a book without a preface. That omission is characteristic. The author starts in at once, without talk about what he is going to tell, but tells you at once how to make and care for a lawn. Then follow other practical chapters on gardens, window boxes, flowers, greenhouses, seasonal work, growing plants for table decorations and village improvement societies.

Mr. Rexford is an acknowledged authority on his subject, and the publishers have set forth that he has to say in excellent manner.

The book, like many others of its kind, has one great fault, in that it lays all stress of interest in plants on aesthetics. The whole point of view is that of decoration. Not a suggestion is given of interest in the plant itself. I wish some one would write a book on the garden and tell of plant life, as well as plant care and flower decoration.



PORCH POSTS WELL CLOTHED IN VINES

From "Four Season in the Garden" by Eben E. Rexford

"Our Trees and How to Know Them:" By Clarence M. Weed, D. Sc. Photographs by Arthur I. Emerson.

This book is ideal in its simplicity, convenience and fullness for ordinary identification and description. A page of text faces a page of illustration. The photographs are for the most part from wild nature, and show the entire tree, leafy branch, flowers and fruit. The whole story is gained almost at a glance at the two pages.

The book is well printed. The cover is especially attractive and in good taste.

Wild Bees, Wasps and Ants, and other Stinging Insects. By Edward Saunders, F. R. S., F. L. S., etc. With numerous illustrations in the text, and four colored plates by Constance A. Saunders. London: George Routledge & Sons, Limited, New York: E. P. Dutton & Co.

These pages are written only for the non-scientific, as the scientific entomologist will be already familiar with the elementary facts recorded; but it is hoped that they may be of interest to lovers of nature who wish to know a little about the insects they see round them and how they spend their lives.

Handbook of the Trees of the Northern States and Canada East of the Rocky Mountains, Photo-Descriptive: By Romeyn Beck Hough, B. A. Author of "American Woods." Lowville, N. Y.; Published by the Author.

It has been thought by the writer, and has frequently been remarked by others, that a series of carefully made photographic illustrations of the fresh leaves, fruits, leafless branchlets and typical barks of our various trees would be appreciated alike by the professional botanist, the less technical nature student, the forester and the lumberman. My natural interest in the subject and peculiar vocation made the task of the preparation of such a work peculiarly inviting to me. I am required to be much in the field observing the trees, making it my personal duty to gather the woods used in the publishing of my "American Woods"—in order that I may be able to vouch for authenticity—and this gives me unusual opportunities. I accordingly entered upon the task with enthusiasm, providing myself with an excellent camera, and adapting it to the peculiar requirements of the work.

It was not until after much experimenting, as to proper lighting, the elimination of shadow, etc., that satisfactory results were obtained. The thought of a measured background—one ruled into square inches for convenience—occurred as a most satisfactory way of indicating size, which I deemed of great importance, owing to the great range of sizes of the objects which I must show on plates of uniform size. It is hoped that this feature of the work will meet with the approval bespoken for it.

[The above is from the preface.]

The book is excellently printed on high grade coated book paper, and is the best book on trees that has yet come to the reviewer's desk. The outline maps with shaded portion showing home of each tree is an extremely happy idea, and tells much in small space. The ruled backgrounds of the leaf and fruit illustrations and the rule placed on the trunks of trees are especially expressive.

AUTOBIOGRAPHICAL.

I was born in Albany, N. Y., the son of Franklin B. Hough and Mariah E. Kilham, both of whom were of English extraction and keen observers of nature. My father's interest in nature was quite general, though he was especially interested in mineralogy and botany. The mineral "Houghite" was named in compliment to him as its discoverer, and bears evidence of his work in that direction. His interest in botany and the study of forest trees awakened in him an early realization of the fact that the course of destruction of our American forests, which had its origin in necessity in the days of our forefathers, had proceeded far enough; that the remaining forests must be protected and the principals of forestry, as in practice in certain countries of Europe, must be established here in America. His diligent efforts to arouse public sentiment in this direction marked the commencement of the forestry movement in this country, the establishment of the Division of Forestry under the U. S. Department of Agriculture and his appointment as our first United States Commissioner of Forestry.

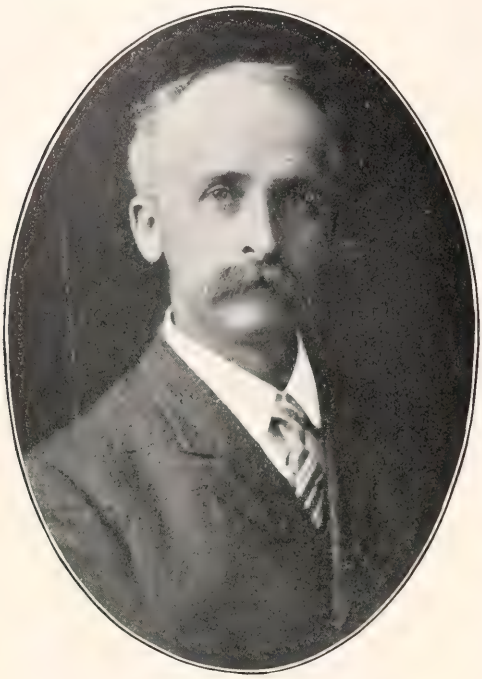
With such parentage it was only natural that my first thoughts were turned to a contemplation of the works of nature, and that opportunities and assistance were extended to me during my boyhood days. I soon became greatly interested in birds and much of my time outside of school hours was spent in studying them. Considerable help and interest was given me in this by my father's life-long friend, Professor Spencer F. Baird, then Assistant Secretary in Smithsonian Institution. I would add that on a commission from him, too, I was sent into Canada to gather Indian relics from certain tribes there, for the Smithsonian Institution.

As early as at the time of the Centennial Exposition I had amassed such a considerable collection of birds that I was invited to display it at the Centennial Exposition under the auspices of the U. S. Bureau of Education, to show the result of a boy's work in natural history.

Later I commenced the study of botany, taking to it, to use the words of my father's prediction, "as a duck does to water," and considerable of my elective work in college (Cornell University) was in that direction. This proved to be an important preparation of what was destined to be my future occupation. I made a considerable study, while in college, also of the birds in the vicinity of the college town and added materially to my own and the University's collections. I afterwards visited the West coast of Florida and made a valuable collection of birds and some fishes of that region.

Having a natural inclination to the study of medicine, I did some preliminary work for entering the medical profession and registered under Dr. C. Hart Merriam, as my preceptor. Dr. Merriam, I would add,

was then practicing medicine in our county (Lewis Co., N. Y.) Our common interest in birds had brought us together in early boyhood, and great was the delight and inspiration gathered by our opportunities of comparing field experiences and specimens collected. With me, as with him, the fascination of our favorite branches of science were too strong to enable us to be content with the practice of medicine. He soon



ROMEYN B. HOUGH
Author of an ideal "Handbook of the Trees."

left it to accept an inviting position offered by the U. S. Department of Agriculture, and is now the efficient Chief of the U. S. Biological Survey.

I put aside the medical work to devote my thoughts to a device for sectioning and preparing woods, in hopes of being able to bring out a publication illustrating it by actual specimen-sections of the woods instead of pictures. It was undertaken at the suggestion and under the inspiration of my father, whose able counsel and assistance were of great advantage to me. My task required first the invention and perfection of a section-cutter which I finally accomplished. In my experimenting with this machine it was found that the transverse sections of certain woods were, to my surprise, of such ivory-like smoothness and strength as to be suitable for cards for commercial purposes. Some of them were accordingly taken out by salesmen to be tried in the trade. The salesmen soon found the trade almost hungry for them, and twice we were obliged to call them in and wait until we could catch up with the orders. The demand necessitated the erection of a small factory with its equipment, and I soon found myself busy in the manufacture of the cards for both the domestic and foreign trade.

This unexpected off-shoot from my original plans caused me to lay aside for the time, the scientific purposes for which I had designed my machine. I was able, however, finally to resume them; but alas! I was obliged now to take up the work alone, as my father, an able counselor, was taken from me by death. The memory of his pleasure in the early success of my experiments and his wish that I go on with my plans strengthened my lagging spirits, and I did the best I could alone.

In 1888 I reached the first goal of my ambition in bringing out the first volume of my American Works. In this I illustrated twenty-five kinds of native and naturalized woods by actual specimens, each species being shown by three sections, respectively, transverse, radial and tangential to the grain, both heart and sap-wood being included when possible. In an accompanying text I gave much information as to botanical characters, distributions, uses, physical and medicinal properties, etc., of the various species considered. The wood-sections were mounted on separable pages and these with the text were gathered into a book-like cover so as to be kept on a table or shelf like an ordinary volume.

Encouraged by the reception of this publication, I have continued the series until I have thus far brought out ten volumes and am planning to bring out five more (two being now in advanced preparation), so as to cover eventually all of the important woods of the United States. A very gratifying evidence of public recognition of the value of this work has been the recent award of the Elliott Cresson Gold Medal by the Franklin Institute of the State of Pennsylvania.

I make it my personal duty to gather the woods used for the specimens in order that I may be able to vouch for authenticities, and while having the material in hand, I prepare also sections for use with the stereopticon and the microscope.

When I commenced issuing American Woods, the art of half-tone illustration existed only as a vision in the mind of its inventor and was not available for my use in photographically illustrating the leaves, etc., of the trees. The developments in that art of recent days have been so great that it seemed to me that a companion work to American Woods, giving carefully prepared photographic illustrations of the characteristic leaves, fruits, winter-branchlets and barks of our various trees with photo-micrographs of wood structures and maps showing distributions should be issued. My interest in the subject and unusual opportunities while gathering woods in the field, seem to indicate that I should bring it out. I accordingly set about the task, but little realizing the many vicissitudes which must

be encountered before its completion. Indeed so numerous were they that no less than five seasons of field work were required before I could pronounce my series of negatives completed and was able to bring out the Handbook of the Trees of the Northern States and Canada, photo-descriptive, which has been recently issued.

DEATH OF CAPTAIN HENRY LOMB.

Captain Henry Lomb (of the Bausch & Lomb Optical Company) died at his home in Rochester, N. Y., on Saturday, June 13th, in his eightieth year.

He had been in poor health for a year, but he had been out among his friends and business associates within a few days of his death, which was due to senility. There was no organic trouble.

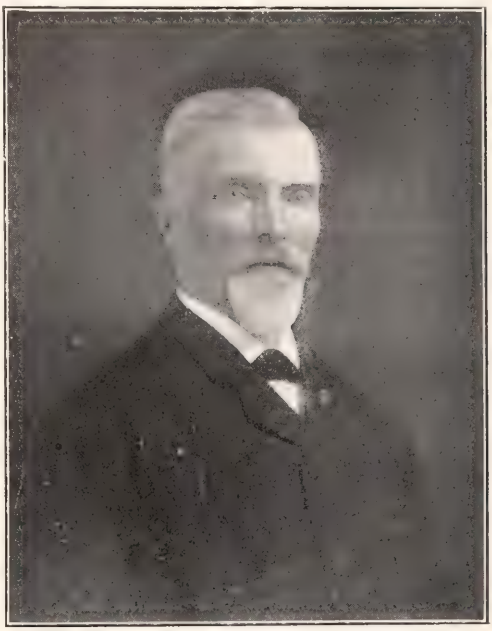
Henry Lomb was born November 24, 1828, at Burghaun, in Hesse-Cassel, Germany, where his father was a prominent lawyer in the district. His mother died when he was five, his father when he was nine years of age, and he had to leave his home when he was twelve years old to live with an uncle. With him he remained about six years, being apprenticed part of this time with a cabinet maker.

In March, 1849, when about twenty years old, he sailed from Bremerhaven for America, and after a voyage of forty-two days arrived in New York on the 1st of May. He left the same day for Rochester, expecting to meet friends there. Here he worked at his trade of cabinet-maker until 1853, when his friend, J. J. Bausch, offered him a partnership in his optical business which offer he gladly accepted, appreciating, however, that the advantages he could bring to the business would be rather moderate, his financial possessions being limited to $60. The business was conducted as a retail optical store, Mr. Bausch and Mr. Lomb making, besides, occasional trips to the neighboring towns, partly for the purpose of selling their goods and especially to make their business better known in the surrounding country.

LONG WAR CAREER.

In 1861, at the outbreak of the Civil War, he responded to the first call of President Lincoln, and on April 23 enlisted in Company C, Thirteenth New York State Volunteers, for a period of two years. At the first election of officers he was elected first sergeant, and later during the term of service promoted by the State authorities to first lieutenant and then captain of the company, serving with his regiment in the Virginia campaign of the Army of the Potomac until the expiration of its two years' time of service. Returning with it to Rochester, he was mustered out with his regiment May 13, 1863.

After returning from military service Mr. Lomb resumed his previous business activities. He was married in 1865 to Miss Emilie Klein of this city. In 1866 the firm decided to dispose of its retail business and give its entire time and attention to the manufacture of optical goods. The firm at the same time decided to make New York city the selling place for all goods manufactured, and Mr. Lomb went there as manager of the sales department of the business, Mr. Bausch remaining in Rochester as manager of the manufacturing department. From June, 1866, Mr. Lomb remained in New York until 1880, when he returned to reside in Rochester, it having then been arranged to concentrate all departments of the business in this city.



CAPTAIN HENRY B. LOMB.

LIVED IN ROCHESTER MANY YEARS.

He lived in Rochester since then, making himself useful in business where best he could and having the satisfaction of seeing the business grow and prosper, and having in 1903 the exceptionally great satisfaction, granted to so comparatively few, of celebrating the fiftieth anniversary of forming business connections between the two original partners, and to have on that occasion the great pleasure of seeing that the firm enjoys the hearty good will of its many employees.

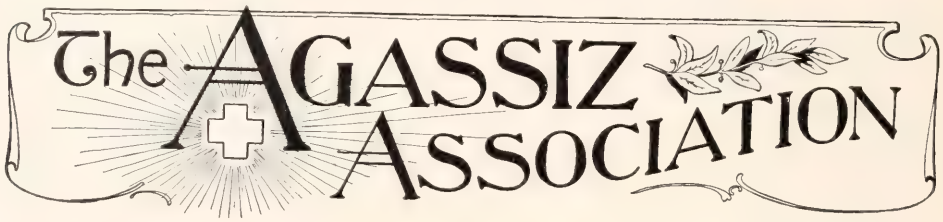
Outside of his business Mr .Lomb had been mostly interested in matters of health, education, veterans of the Civil War, Grand Army of the Republic and associations affiliated with the Grand Army, the German-American Society and some other charities.

The Union and Advertiser (Rochester) says editorially:

In the death of Capt. Henry Lomb Rochester loses one of her most valued and beloved citizens. He was a man of the most nobly unselfish and philanthropic im-

pulses, and unlike many men whose impulses are good, he was active in good works, and never wearied of labor in the interest of his fellow man. He was one of the most modest and unassuming of men, so much so that if that had been possible his name never would have been known in connection with the beneficent acts with which his life was filled. Yet with all the modesty and self-effacement of his nature, with all the gentleness and wide human sympathy by which he was animated, he was a man of rugged strength of character and indomitable perseverance. When he put his hand to an undertaking he never looked back. He achieved his ends by perseverance and by a singular power of arousing the sympathy and good will of others whose aid was needful.

He was active in every movement that had for its object the promotion of the prosperity and happiness of the people. To enumerate the occasions upon which his public spirit and philanthropic impulses have manifested themselves during his long life in this community, would be impossible at this time. His example will long remain in the minds of our people as an inspiration to good deeds.



CORRESPONDING MEMBER NO 2006 OF THE AGASSIZ ASSOCIATION, AT KYOTO, JAPAN.

THE AUTOBIOGRAPHY OF YOICHIRO HIRASE

I was born at home in a town called Fukura, Awaji province, in September, 1859. During my boyhood I attended a primary school of that town, and after finishing the whole course, I studied about a few subjects under two or three private teachers. In 1883, I was married with Miss Yasuko Kashu and directly took charge of the business and agriculture, which were the occupation of my ancestors. In 1888, I removed with my family to the city of Kyoto, and occupied a house at the corner of the street called Shimo-chojamachi and Karasumaru. I put down the old building, rebuilt there a new one according to my own taste, and I still live in that same house. Immediately after my removal I have become a member of the "Kayato Haskubutsukwai"—an association of men who are interested in natural science—for I am by nature fond of natural history. Afterwards they recommended me to a position of secretary and I am still in connection with it in the same post. When I was a little advanced in my knowledge of the natural science, I was acquainted with Mr. Marshal Gaines, an American professor of natural science in Doshisha University. By his influence I decided to study shells. Indeed it was just sixteen years ago when I began to collect Japanese shells. Dr. John Gulick was the second man whose influence was also great. Influenced by these scholars, I gave up everything except the study of shells. At that time everything was new to me. I had no experience in this work. I knew nothing about the shells. Where are they living? How shall I collect and when? How shall I make specimens? I knew nothing of these matters; had nobody to inquire of, and no book to see. I was then almost in confusion about what to do.

Happily at that time from thousands of miles away, Dr. H. A. Pilsbry of Philadelphia, and many other conchologists of Europe and America helped and led me to the right direction of the study, and my work began to progress by and by. I often tried myself to go out for collecting, but it is impossible for me to go all over the country by myself, though I did sometimes!

For the purpose of collecting shells from four directions, I published a pamphlet called "Guide to Shell Collectors" and distributed them to the natives of different provinces. I suppose that I might receive from them many interesting species. The result, however, was not satisfactory as I first expected. Then I sent several assistants. They had to teach the natives the way and benefit of collecting shells, as well as they collected themselves. The natives understood the interest of collecting very well, and even after my assistant left them, I have fresh supply from time to time from over fifty collectors in different provinces. Thus my exploration has extended from Hokkaido in the north to Formosa in the south, without giving up even very small islands, which are like specks in the ocean, and also very dangerous valleys amid the shaggy mountains cannot escape from the keen eyed collectors. Last year I extended my search in China and Korea. My further plan is to extend the range of my observation to all over Asia for the comparative study with Japanese mollusks. The species I have collected until to-day reached over three thousand. Among them new species and subspecies founded by myself and under my care are above one thousand.

There are also many genus, and species that are called after my name, such as Hiraseilla, Hirasea and Hirasei.

At the meeting of the Academy of Natural Sciences of Philadelphia, I was appointed a correspondent of that Academy and in next March they asked me to send my photograph and a sketch of my life. They were going to hang my picture on the wall



YOICHIRO HIRASE.

of the museum. I sent them with pleasure, and regarded it a great honor.

The practice of the shell-collecting in this country is not new. We hear of its existence in the old day. But its way was quite different from what we see to-day, which is a scientific way. As for the classification and their names, they studied carefully. Many chapters are devoted to the descriptions of shells in old day books of natural history. Not a few of old sports which play with shells, such as Kaiawase, and Kaioi, are still remained. Among the old conchological books, Mkuhachi and Kaishi are comparatively large works, which contain thousands of shell figures with their descriptions. These books are all hand-written, appearing sixty years ago. Authors of that day even touched a little upon the study of land shells. If the study had not been stopped until now, the development and progress of this study will be very great.

Valuable specimens, however, had almost scattered, and most of them were lost and I know no way to regain them.

I though but a poor and uneducated person, decided to do what was the will of the old scholars to show the nation the interest of the study, as well as to introduce Japaneses mollusks to the world, supplying the world scattered conchologists with good shells. And this latter is my ideal from the first and I am glad to observe that a part of it was already done.

My collection of shells reached over eight thousand, including foreign species. However, I have no place, at present to put them in order. Of course, of no use they are, if they merely are piled up in the store. Though there is one museum in this city, the collection is chiefly confined to the fine art specimens only and we can have no room for any other specimens to arrange in that museum. Therefore, I am intending to establish in this city an independent conchological museum to meet the pressing need of the public. This is one part of my life-work. The other is the publication of a complete illustrated book concerning Japanese mollusks. It is almost impossible for me to erect from the first a perfect museum, so my plan is to find a suitable portion of ground and erect there a small temporary building for the use of the museum, in the near future. By the rapid expansion, however, of the economic condition in this country, after the late war, which caused an advance in the price of land, I am perhaps unable to secure the ground in this year, for the fund in preparation for the land will not pay off at present. I have to wait for the fair opportunity. From the lack of sufficient number of subscribers to my conchological magazine. started from January, 1907, I suffer no small loss monthly. As we need much more capital for the future accomplishment, my family are taking every care in wasting nothing, for the accumulation of money though bit by bit, for the future need.

As for my work. I am absolutely independent on my financial position, while I have a worthy helper in my conchological study whose name is Mr. N. Kato. So the question in point is not the question of dollars and cents whether I may fulfill my undertakings or not. There must be still more endeavor in this respect.

In religion I was born as a Buddhist. But a few years before my removal I had an opportunity of hearing about the Christianity and I was deeply touched. After my coming to Kyoto, I was acquainted with Professor M. Gaines, as I said, and also with late Dr. Joseph Neesima, LL. D., who is the founder of Doshisha University. Often having heard from them about Christian faith, I began to see the light of Christianity. In 1889, myself, my wife, parents, sister and brother, all on the same day were baptised and belonged to "Heian Kyokwai," a Congregational church. Now I am one of the found-

ers of Kyoto Y. M. C. A., and last year I was appointed one of the directors of the association.

I have several assistants who help me daily. They are all Christians except a painter. As they serve their duties faithfully, I can manage this most intricate work very smoothly, hoping daily the future accomplishment. No people in this country took so much care for such a work as I am engaging hitherto. Things are changed recently, and they began to notice every scientific investigation. Often in several newspapers of different provinces and cities, articles concerning my work appeared. In one of the largest and most influential papers, the Asahi, I was put among the famous hundred men for whom the editor gave watch of praise in daily paper, introducing their achievements to the public. On the paper of April 8th, an article concerning myself with my picture appeared with much praise. This is unfit to me to put, such as I am among the prominent hundred of Japan. I am rather ashamed of it, for I have nothing in me that deserve such a praise. But to my own thinking, this proves the fact that the people have become interested with the scientific observation.

WATCHING FERNS DEVELOP.

REPORT OF CHAPTER NO. 587, CONCORD A, NEW HAMPSHIRE.

MRS. ELLEN S. LAMPREY, PRESIDENT

MY FERN BED UP TO DATE.

(MAY 11.)

"Have ye watched that ball unfolding
Each closely nestling curl,
Its fair and feathery leaflets
Their spreading forms unfurl?"

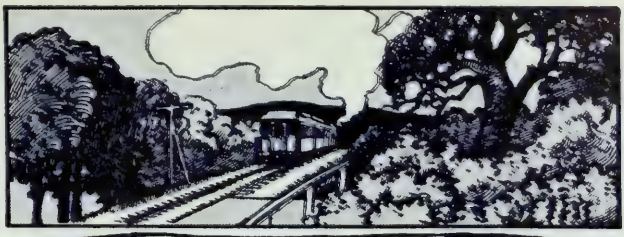
The Osmunda Claytoniana or interrupted fern is seventeen inches in height with the coils unfolded. The rachis is a beautiful green and the fronds just on the point of release from their cramped quarters. I mark it as the most interesting and conspicuous of the Osmundas. Next in beauty are the coils of the royal. They are delicate, color a beautiful brown and gold. They are five inches from the ground. The rachis has a pretty purple tint. All these foreshadow the beauty of the fern later, and entitle it truly to its name, royal. The Osmunda cinnamomea has conspicuous coils covered with "wool." It is only five inches or less from the ground and it will be days before we see fronds, a contrast to the Claytoniana beside it. The heavy, brown spore plume of the ostrich fern has a circle of green fronds eighteen inches in height. The coils are coarse and heavy, some just ready to unfold. The Nephrodium marginale have similar coils, but are a rich brown and chaffy conspicuous as they still hug the earth.

One can hardly mistake the lady fern as the old bracts on the rachis distinguish it from the others. Its coils are also of good thickness. I have several roots of red and green growing side by side, so it cannot be the soil that causes the difference of color. The Nephrodium spinulosum have a chaffy stem and heavy coils. The beech ferns are up and uncurled but not yet developed into the graceful fronds that flourish under the syringa bush. The delicate oak fern looks like the tangled foretop of a social dame, for the fronds are all kinks and coils that later have the beautiful gold green leaves that peep from a sloping board that protects it from the merciless drip of the eaves. The Woodsia ilvensis coils are not unrolled; another Woodsia (obtusa) has a few small fronds. The coils of the silvery spleenwort are coarse, smooth, brown and not unrolled. The little polypody, the old green shoots, the coils not conspicuous.

The Dicksonia (hay fern) is not above ground but when it appears it will be as individuals—one frond in a place; but so close are they that we think a whole rank of the white plume of Henry of Navarre are near as the tip unrolls last and gives the bed a curious and beautiful appearance of waving plumes. The fronds of the fragile Cystopteris are a few inches high. The beautiful fruiting fronds of the sensitive fern have dropped their brown heads and look delicate beside the stiff brown plumes of the ostrich ferns which last year stood five and one-half feet in their stockings. The sensitive is marked by a red rachis and a red tinge to the fronds. The Nephrodium Noveboracense (New York fern), fronds well above ground; the narrow leaves at the lower part distinguish it; they are less and less almost to the ground. Nephrodium Thelypteris, the leaves stop half way down the rachis, ending in leaves equal to the ones above and a long, naked stem. The Pteris aquilina are not up yet. These are scattered about the grounds like bungalows in the country, while the others are in the limits of the city's bed or streets, for there is the Lady Fern Street, the Dicksonia Alley, the Ostrich Court, the Public Square of Osmundas, Beech, Boottii and others. But the silvery spleenwort has the place of honor near a historic white rose and the haunt of the humming bird. The broad beech fern is not up. The cinnamon fronds in woolly clumps dot thickly the near by park. The lady fern, red and green, and Noveboracense are under the thorny cedar trees while the Pteris aquilina (brake) near masses of dark blue violets are not up and I hope no reader will covet them for greens, whose beauty has saved them from the edge of the scythe, lo, these many years.









The Guide to Nature

Stamford, Conn.
Edward F. Bigelow, Editor

Vol. I SEPTEMBER, 1908 No. 6



"When we learn to love nature more than art, and the heaven of such a place as this more than the world of cities and palaces."—Wilson Flagg.

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PUBLISHER'S NOTICES

The Guide to Nature

AN ILLUSTRATED MONTHLY MAGAZINE FOR ADULTS. DEVOTED TO COMMONPLACE NATURE WITH UNCOMMON INTEREST.

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Entered as second-class matter, April 6, 1908, at the Post Office at Stamford, Conn., under the act of March 3, 1879.

ENLARGING AND IMPROVING.

THE GUIDE TO NATURE grows steadily —in circulation, advertisements, interest, illustrations, size and general appearance.

With no little pride do we call attention to the new cover design. It was drawn by Walworth Stilson, whose dainty and expressive handling of pencil, pen and brush in beautiful portrayal of nature reminds one in many respects of that master naturalist-artist, the lamented William Hamilton Gibson.

We have added eight pages, and have made still more room for reading matter by setting several department pages in "8 point" instead of "10 point" type as heretofore.

In new features we have in this number an excellent article by Miss Charlotte M. Hoak, our Los Angeles manager, on "Interesting Desert Forms of Plant Life." This is of especial interest to naturalist-tourists in the southwestern part of our country.

That interest in the magazine is steadily increasing was shown in part by letters from twenty-five subscribers published in the August number.

At last we have for the adult a nature magazine that is really worth while—not only for what it now is but for what it promises to be.

We are grateful to all patrons who in this, the first of our "four great special numbers," have enabled us to take this long step in advance. The indications are that all future issues will have a similar, perhaps even a greater value and effectiveness.

AN IMPROVED PLANISPHERE.

Star gazers will find a most ingenious and helpful aid in their observation of the stellar worlds in the Barritt-Serviss Star and Planet Finder. It is a revolving planisphere map showing only the stars that are plainly visible to the naked eye, and, in addition, introduces the Sun, Moon and planets by a system of needle-pointed thumb tack discs which are entered upon the plane of the ecliptic by a conveniently arranged table accompanying the chart and covering a period of twenty years—one year to a page. The ecliptic is plainly shown upon the map by a red line divided into 360 degrees and numbered every fifteen degrees. The Book of Tables tells upon what date and degree to enter the disc when, by setting the day of the month on the margin of the revolving map opposite the desired hour of observation, the Stars and Planets on view at that hour will show in an opening in the top of the map. When properly placed the time of the rising or setting of the sun, moon or any planet or star can be very closely approximated. It is a most decided advance and improvement upon any map of the heavens for popular use, requiring no technical knowledge, and is receiving the highest endorsement of professional astronomers, navigators and laymen as it does away with the necessity of working out the positions of the planets from the sideral time as given in the Nautical Almanac.

The planets Venus and Jupiter are the most beautiful stars in the heavens—and Mars and Saturn when in opposition exceed in brilliancy the first magnitude stars—Venus and Jupiter always exciting comment by their splendor, especially the former, which is now very beautiful in the morning sky. Heretofore the layman has had no means of distinguishing these wanderers of the sky, but with this apparatus he can easily do so.

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WHERE THE BREAKERS DASH INTO SPRAY ON THE ROCKS.

Photograph by H. G. Peabody, Pasadena, California. Cut by courtesy of the Bausch & Lomb Optical Company.



"Wonderful, indeed, is the world of beauty about us,
More wonderful still is the world of beauty within us."

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I SEPTEMBER, 1908 No. 6



Interesting Forms of Desert Plant Life

BY CHARLOTTE M. HOAK, LOS ANGELES, CALIFORNIA



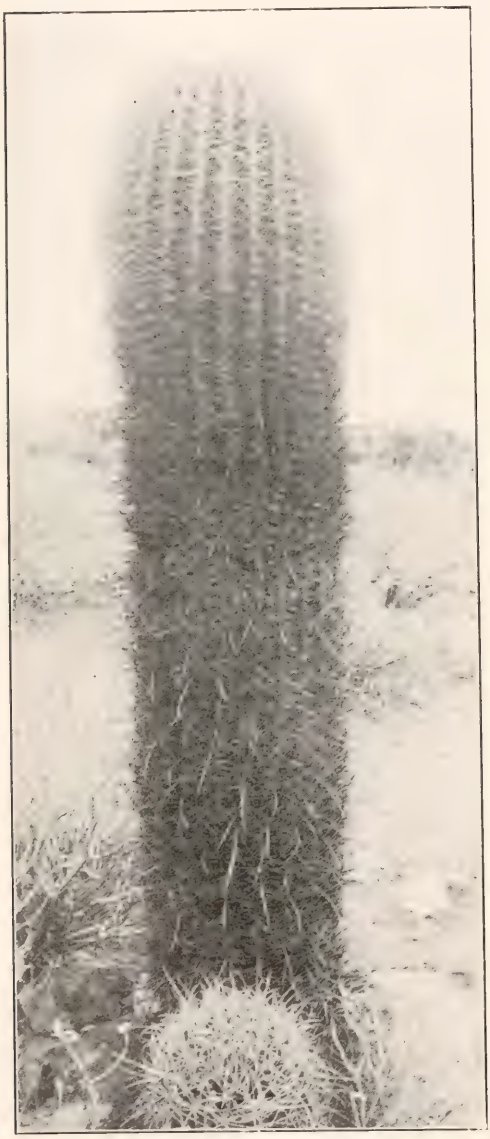
TO the lovers of the unique and wonderful in nature the great Colorado desert or "The Land Beyond," is a veritable land of enchantment—a land of strange anomalies, of stones that float, of wood that sinks, bare twigs that blossom, of burning heat, of shifting sands and magic illusions.

No factor of all its varied life is more interesting than the innumerable types of desert flora. Here, in this land of little rain, a fierce struggle for existence goes on continually. The methods employed by the different plants in their efforts to extract a scanty sustenance from the parched soil, the care with which they husband with utmost frugality their precious hoards of water and the means they employ to defend themselves against the savage animals, as hard put by thirst and famine as themselves, offer the most interesting field for study and investigation to the nature lover. As these desert forms are observed day after day new secrets of nature are revealed.

We marvel at the wonderful powers of endurance and resistance displayed by each plant which maintains for any length of time a footing in this desert country. How truly is each one fitted for a contest that besets no other form of plant life, and Nature has called into play her most far-sighted cunning in equipping her less favored children for their fierce struggle with the elements.

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Examine the root systems first. Deep rooting is common to many of the plants that are near enough water to reach it in that way. Sometimes you happen on a ledge that has been laid bare by the action of the weather and are sur-



THE BARREL CACTUS.

prised to find massive networks of roots supporting a comparatively small growth above ground. This deep rooting system is characteristic of the mesquite. A bit of holly no more than eighteen inches high will often be attached to a set of roots as many feet long. Other plants, like the wild gourd, have storage reservoirs in the form of thickened roots, and it is no uncommon sight to see this plant green and flourishing long after everything else has succumbed to the burning heat. Deep rooting is by no means the rule with desert plants. In some places no amount of delving downward would reach water. The ground is as dry as a proverbial powder house year in and year out with the exception of brief periods that bring occasional wettings to the upper layers. Hence many plants like the "cat's claw" acacia and the chol-la cactus have what is called a double rooting system. The surface roots then perform the important function of gathering the little moisture that does come their way.

Once above ground every care is exercised to guard against unnecessary evaporation. The geometrical form assumed by the characteristic desert plants presents the very least surface possible. Nearly everything is round or globular. There are few, if any, wide spreading, leafy trees in this sun parched country. Again most desert plants do away with leaves as much as they can; in fact, some dispense with them altogether. The cactus has thorns; the acacia has the phyllodia which stands vertically; others again have leaves at the brief blossom period, but discard them afterwards to stand like bare, thorny poles the remainder of the year. It has been estimated that the ordinary cactus exposes only one-thirteenth of its surface, while the coffee, another tropical plant, about seven hundred times as much surface in proportion. If, however, plants do see fit to keep their leaves they shell-lac them over with a shiny, resinous varnish like the creosote bush or cover themselves with hair like the "old man" cactus. The long seasons of drought compel each plant to resort to safe methods of conserving their water supplies. Each plant maintains some kind of a storage reservoir. If not a deep or thickened root system, then the thickened stem and leaf. The average cactus is with its thickened stem and leaves over ninety-five per cent. water.

So full of water is one of these cacti that it is commonly called "the desert water barrel."

Having provided themselves with water and food enough to sustain life it next behooves each one to protect well its precious hoard. And how well protected are these fierce plants of the desert. Only animals driven by a compelling desperation of hunger and thirst have courage to run the gauntlet of their formidable armor. Harpoons, thorns, barbs, prickles and spines by the thousands lacerate and sting unmercifully whatever invader makes bold enough to despoil their treasure. But



A VERITABLE VEGETABLE PORCUPINE—THE "NIPPLE CACTUS."

all does not typify a keen, hard put struggle for existence. Blossom time comes to the desert and then wealth of bloom rivals the most beautiful culti-



YUCCA IN BLOOM.

vated gardens in magnificence and variety.

One can hardly imagine a plant more beautiful than the stately *Yucca alifolia* when it puts forth its long blossom stalk, varying in height from ten to thirty feet, and hangs aloft myriads of pendulous, waxen lily bells beautiful beyond description. The poetic Spanish Californians were keenly alive to their exquisite beauty, Their brown robed friars saw them afar off and likened them to a host of warriors marshalled on the plain, or to great white candles set in magnificent array upon a golden, sun-burnished altar. The traces of their fancies still linger in the local names of "Spanish bayonet" and "Our Lord's candlestick."

Another striking plant is the occotilla. Botanists know it as *Fouquiera splendens*, but it has a host of local appellations, such as "vine cactus," "candle wood, "Jacob's staff" and "devil's fish pole." In the main these local terms are easy to account for. In the first its brilliant cacti-like blossoms and thorny stems resemble that family very closely. The name "candle bush" or "candle wood" is applied because its stems, literally soaked in resin, will burn for hours like a flaming torch. A staff it has proven to many a weary traveller, and you can scarcely imagine a twig more fittingly designed to be a "devil's fish pole." But after all the crowning glory of this thorn of thorns are the splendid spikes of graceful, fiery, fuchsia-like blossoms. On the rough brown hills they gleam afar like thousands of flaming torches.

Every shrub and bush has its brief period of luxuriant bloom. Softest pastel shades suffuse their delicate tints in the most barren canons and in very truth the "desert blossoms as a rose." Of these numerous small trees and bushes none is more beautiful than the "palo verde," with its lace-like film of leaves and golden shower of blossoms.

The cacti by many are considered the glory of the desert. The blossoms display nearly every color, tint and shade known to the plant world, but the vivid scarlets, deep crimsons, glowing purples and warm yellows are the usual shades displayed. Satiny pinks, soft lilacs and creamy whites are by no means uncommon among these gorgeous flowers which vie in coloring with the richest colored orchids. How wonderfully



YUCCA WHIPPLEI.
A section taken from a stalk of six thousand blossoms.

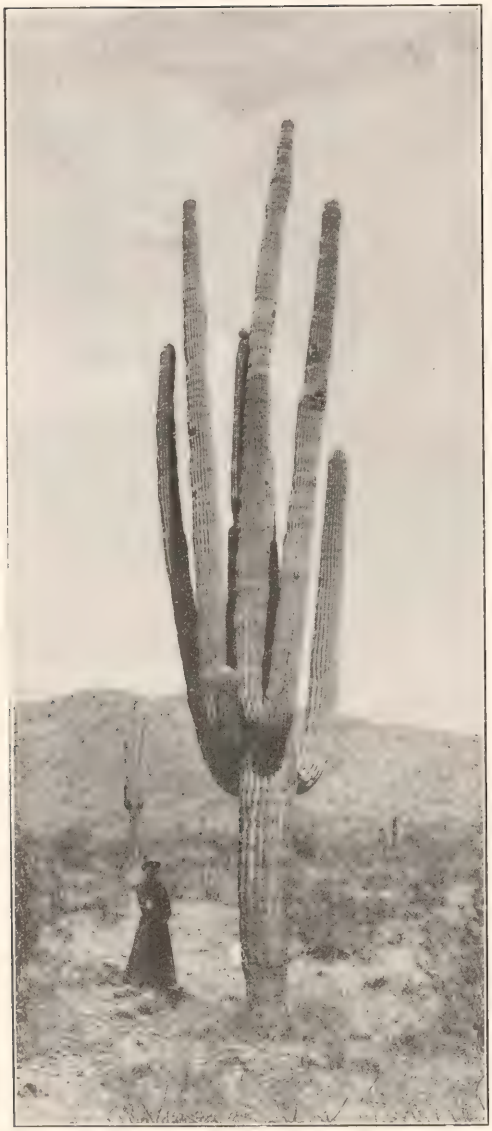
beautiful are these rich blooms against their natural backgrounds of somber greys and browns.

One of the most picturesque foliage plants of the more desolate portions of the Colorado desert is the native California palm, *Washingtonia filifera*. A typical desert sentinel, it lifts its head aloft into the burning heat, a type of fearless endurance. Imagine, if you can, a whole colony set in magnificent array as one comes upon them in the "Canon of One Thousand Palms."

Almost as high as their wonderful



CACTUS BLOOMS.



THE GIANT CACTUS—A BEAUTIFUL PLANT.

beauty stands the remarkable utility of these plants of the desert. Forced by stern necessity, the desert dwellers have learned to put to some use everything which the barren soil produces. Food, fibre, materials for houses and medicines, all come from the seemingly scanty storehouse.

The mesquite has been called the mother tree of the desert. It supplies building material, firewood, dye, pitching gum, basket twigs and, last of all, food. In fact it is to the people of the desert what the bamboo is to the people of the Orient. The rich and nutritious beans it bears are eaten raw and cooked in their green state by the Indians. These long pods enclose a seed rich in oil, and when thoroughly dry the Indian women grind them into flour in their primitive mills of flat stones. This flour is made into mush, hard bread or fermented into a kind of beer. Even the dry pods themselves are sweet and contain much food value.

Another food plant very highly prized is the mescal or Mexican maguey, an agave which is a close relative of the century plant. The time for blossoming draws near and the Indians far and near hasten to the slopes where the mescal plants are most numerous. They gather in the huge buds, in appearance much like gigantic asparagus tips. The whole



CHOLLA CACTUS.



THE NATIVE CALIFORNIA PALM.

harvest is brought to the baking pits and a "mescal bake" ensues much after the fashion of a "down east clambake." After three days the big baking is finished and then the mescal heads are raked out of their covering of leaves and hot stones, soft, sweet and deliciously, something like a sweet apple.

The Indians have learned another use of this plant, which is often called the "thread and needle plant." Each one of the thick, succulent leaves terminates in a sharp, spike-like thorn. This thorn is firmly fastened to a stout, thread-like fibre which runs the whole length of the leaf, often three or four feet. When the fibre is stripped from the leaf the thorn remains attached, a thread and needle ready for use. With such needles the Indians do much of their crude sewing.

There is still another use to which the mescal is put. From it an exceedingly intoxicating drink is distilled. It is villianous in its effects, often inciting its devotees to commit the most atrocious deeds.

The cacti have more uses perhaps than any other family of the desert plants. They furnish a wide range of fruits and material for sweetmeats and the green, succulent leaves are used for vegetables. Material for the framework of houses is furnished by the skeletons of the larger varieties. Several varieties are used to make fences and hedges. In early days the mission fathers defended themselves from the attacks of hostile Indians by putting up impenetrable barriers of the ordinary tuna. In Mexico the organ cactus is still used to make fences. Pieces the desired length are cut off and placed in the ground, and when they take root and grow they form an admirable guard against the invasion of either man or animal. The thorns serve as needles and pins and those of the "bisnaga" are used as toothpicks. It is said that certain species furnish the Indians with hairbrushes.

The yuccas furnish both food and fibre. Young shoots are cooked like cabbage. The fruit is dried and ground into a



THE TREE YUCCA.

meal. The tree yucca *(Yucca arborescens)*, the most weird and spectral of all the desert trees, yields an excellent, corky fibre as well as meal from its fruit. This spongy fibre serves as storage tissue for this tree, whose strange habits and appearance would furnish material enough for a long article.

The native desert palm is almost worshipped by the Coahuila Indians. And little wonder, for from it they obtain food, fibre, shade and material for their rude, thatched huts. These Indians have many rights and superstitions connected with this palm. When a child is born its parents plant a palm. The tree becomes the special property of this child and as soon as he gets old enough to understand he is given full charge of it, cultivating it and worshipping it throughout his lifetime. When he dies the tree is cut down and burned to ashes.

We are apt to think that the more conspicuous plants, especially fitted to endure the hardships of desert life, are the only ones that can exist under such trying conditions; but this is not so. The ordinary annuals have their part in the desert blossom time. A sudden rain comes, and like magic the sandy plains and barren canons become transformed by gorgeous, wind-blown tapestries of poppies, lupines, primroses, violets and verbenas. Here, too, we find the annuals "making the most of" the brief span of life allotted them. Maturity follows closely on the heels of youth. Every flower seems to join in the mad rush to bloom and ripen seed. Three or four weeks and the transient glory fades, and what was a riotous tangle of blossoms lapses back into sun-baked desert again.

If one would study a new side of plant life, let him follow in the wake of spring in the desert. The habits of many of the well-known species, as well as those of the unique species which belong to the arid sections alone, will afford ample material for years of original investigation, and as one studies, a side of nature undreamed of before will become revealed.

SUGGESTIONS FOR TREE STUDY.

BY E. EARL DU BOIS, OGDENSBURG, NEW YORK.

In the whole realm of nature study there is to me no subject so fascinating and of so much real worth as the study of trees and their relations with their surroundings. They combine the useful with the beautiful, and can be studied from both the æsthetic and economic standpoints. As living things, they assimilate food through their roots, carry it up and down through their cellular structure, and build it up into woody fibre, and all the time breathe through their leaves and give off water vapor—three life processes which are parallel to those of men and animals. Trees are everywhere common. They may be studied in any place, at any season of the year and during all stages of development. They will become the friends and companions of man; or, if he demands it, give up their lives to serve him.

The writer has been a life-long student of trees, and some of his observations may be of interest to others who desire to become more familiar with this interesting branch of nature.

To get the most out of the study of trees, they must be regarded as individuals; particular trees being selected and every change in their growth and development carefully noted, from season to season and from year to year. It is not enough to know every kind of tree by its name, valuable as this information is; it is not enough to wander through the forest and admire the trees for their beauty of form and foliage; the vital processes of their life, the changes which are constantly going on in and around them, and their struggles for existence against environmental conditions must be known. They will then become related directly to our own lives, and that delightful sense of ownership in and regard for the trees will be realized.

At each returning springtime, I would select several trees of different species for study during the year, as well as continue to watch for any changes that may be going on in those that have been studied during previous years. Some of these can usually be selected in our own gardens or, at least, near to our homes; but in order to get a sufficient number of species it is usually necessary to mark trees in some field or forest where they can be seen at least once each week during the springtime, and occasionally during the remainder of the year. Several species should be selected in one family to show likenesses and differences; for example, two or three kinds of maples should be observed; and, on the other hand, widely different species should be noted, to show how each keeps its individuality and how each species responds to different conditions.

The study of a group of trees can be begun at any season, but winter is the best time. The naked forms can then be seen, their manner of branching, the angles made by the branches, the arrangement of the buds, the form of bud scale and leaf scar and the "annual ring" markings of the different years' growth can be more easily seen than in summer and at a time when most nature-study subjects are inaccessible. It is well for the beginner to keep a note-book. As spring approaches, mark a few small branches on each tree, note changes from week to week as the buds swell, which develop leaves and which flowers; where each are located, and many other things which will suggest themselves to the student.

To illustrate what can be done by marking branches, I will give one experiment. Mark a branch on some tree or bush. In early spring cut away all the large buds which were formed the previous year, then the buds on the two-year-old part of the branch will begin to grow after being dormant for a season, and carry on the life of the branch. This illustrates the remarkable provision of nature for the tree's welfare in case the outer branches bearing the new buds are destroyed by storms or the buds eaten by birds.

In some such way an endless number of experiments can be made and many interesting observations carried on. They may be made for pure pleasure, or as a stepping stone to scientific research.

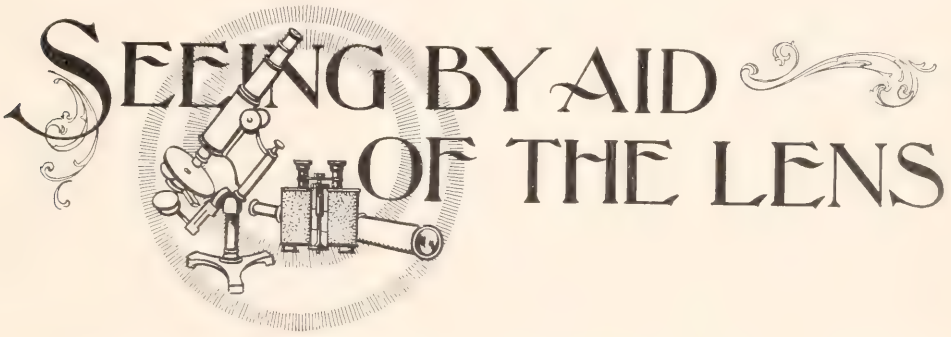
The phenomena of nature move in a continuous procession, forward and upward. We may look first at the seed,



A GRAND OLD OAK.

Well worth the careful study of tree lovers. How picturesque and sturdy. Consider the time and changes of such an oak.

watch its development into the little plant and its gradual growth into the giant tree, or we may start with the swelling bud in springtime, watch it throw aside its winter coat, and soon become the mature leafy branch or the beautiful flower. In either case we have seen the growth of a tree or a branch, we have seen the transformation of the inert matter of the soil, with the sunlight energy, into a living organism, and we are studying nature. The man who has studied the life of a tree has a new friend on earth and has a new insight into the heart of things.



THE WONDERFUL AND BEAUTIFUL DIATOMS.

That all waters which be upon the earth teem with animal and vegetable life even more abundantly than the earth bears its burden of living creatures, has been so often said that the remark has become hackneyed to a tenuity that is nearly unable to support its own weight. Yet the assertion is strictly true, and no one is more familiar with the fact than the microscopist. The seas of the world are crowded with beings from "leviathan" down to creatures so minute, that the highest powers of the microscope are required to make them only imperfectly visible. The fresh waters are no exception. Every drop that comes from the public reservoir into the writer's house, brings with it an average of five living animals, all minute to the point of invisibility, and all harmless, yet they are present. Vegetable life is no less abundant. Setting aside all thought of "microbes," bacilli and bacteria, other minute plants thrive, flourish, act their part, and die within the waters in even greater numbers than on the land, and these numbers are often so enormous that the mass becomes visible to the naked eye.

A diatom is a plant enclosed in a case of silica, upon whose surface nature has lavished some of her most exquisite specimens of minute carving, elevated lines, delicate dots, whose character is even now not clearly understood, apertures, circular and hexagonal, and so small that the optical difficulties involved in their demonstrations are almost insuperable, and have occasioned many a wordy war among microscopists. These siliceous cases being indestructible even by boiling mineral acids, have long served as tests for the optical qualities of the best microscope objectives, and also for the good nature and self-control of contending microscopists.

A glance at any of the accompanying illustrations will give an incomplete and inadequate notion of a small variety of the forms, and perhaps of some of the surface markings, although to show these clearly demands high magnifying power, and careful illumination of the microscope. To exhibit variety of form the arranged groups, Figs. 1, 2, 3, are particularly pleasing, as they are prepared in an artistic way, and are well worth extended examination. A few of the objects in Fig. 2, especially those in the outer circle, are not diatoms, but have been introduced to give the picture the desirable finish and artistic effect. When the reader remembers that all these objects are invisible, except under the microscope, he may appreciate the skill of the man that could and would

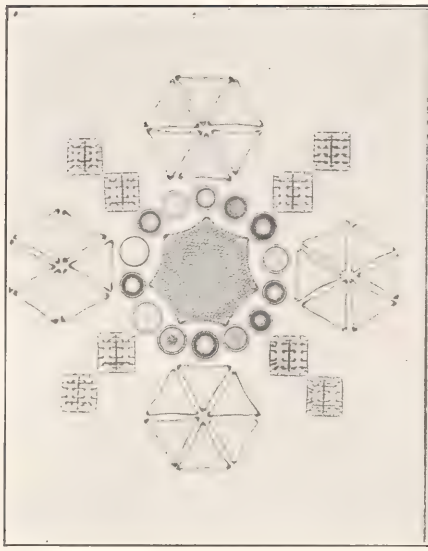


Fig. 1.

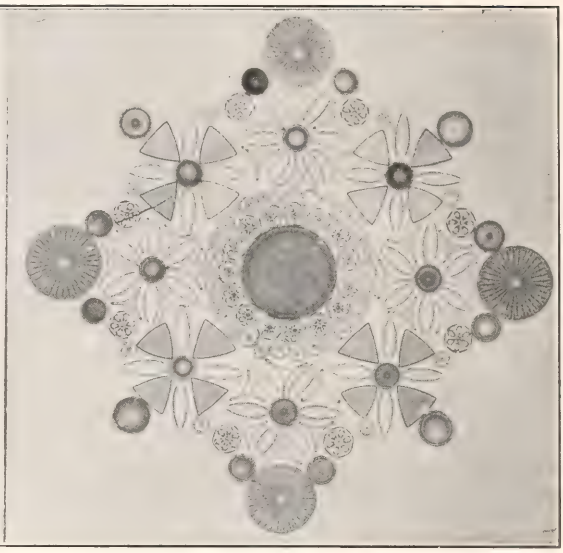


Fig. 3.

pick up, one by one, the minute things, carry them on the tip of a hair from beneath one microscope to a disc of glass under another instrument, and there arrange them in the charming groups here photographed. The time, the patience, the skill required in such work are beyond words to describe.

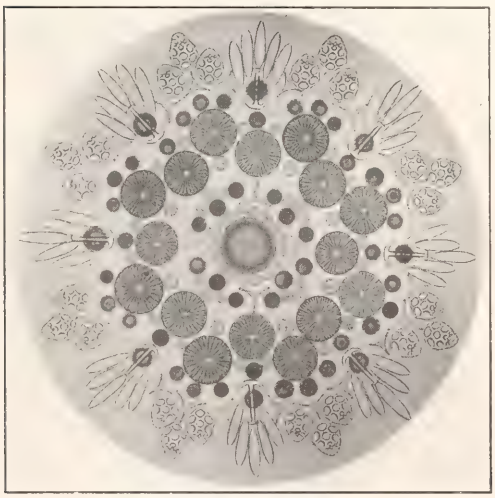


Fig. 2.

On this page are shown diatoms arranged in artistic groups by the skill and the indomitable patience of a professional preparateur of microscopical slides.

The other illustrations (Figs 4 to 9), have been selected to show not only variety of shape, but peculiarity and differences of sculpturing. Fig. 4 is notable in both these features; Fig. 8 might by the housewife be compared to the lids of certain kitchen utensils, with depressions for the thumb and finger; Fig 9, *Heliopelta,* is the "sun-shield," the two sets of rays being beautifully shown.

The scientific name of each diatom is designed to describe some quality peculiar to the species or to the genus, although it is sometimes difficult to decide just what its sponsor meant by his combination. Fig. 4, *Coscinodiscus,* is the "sieve-like disc"; Fig. 5, *Triceratium sexangulatum,* is the diatom with three little horns, as some of the species have, and six angles; Fig. 8, is another species of *Triceratium,* and apparently with greater reason for the name.

Many years ago, Professor J. W. Bailey, writing on this subject, said that the mountain brooks about West Point, had the surface of the mud "literally covered in the first warm days of spring with a ferruginous-colored mucous matter, about a quarter of an inch thick, which, on examination by the microscope, proves to be filled with millions and millions of these exquisitely beautiful siliceous bodies. Every submerged stone, twig, and spear of grass is enveloped by

them, and the waving plume-like appearance of a filamentous body covered in this way is often very elegant."

The brooks about West Point are no exception. The writer has seen a similar mass of different diatoms so densely covering a space a hand-breadth wide, that it was collected by the spoonful, and on a microscopical examination proved to be a natural culture, with absolutely no admixture of other diatoms or of any other microscopic object. In a past geological age (Tertiary) diatoms in the greatest and most beautiful varieties have so flourished, that they now form deposits thirty or forty feet in thickness and estimated that a cubic inch of a similar deposit, contains about forty-one thousand millions of these organisms.

A motile microscopic object naturally suggests animality, as motile plants seem to be uncanny things, and not to be accepted without protest. Diatoms have not escaped that fate, since some, not all, are spontaneously motile, although microscopists at the present day believe that they are plants. If a perambulating diatom has its freedom, it will mysteriously advance directly forward until it meets an obstacle, when some forms will hesitate, push, and then retreat, to advance again in another direction; others,

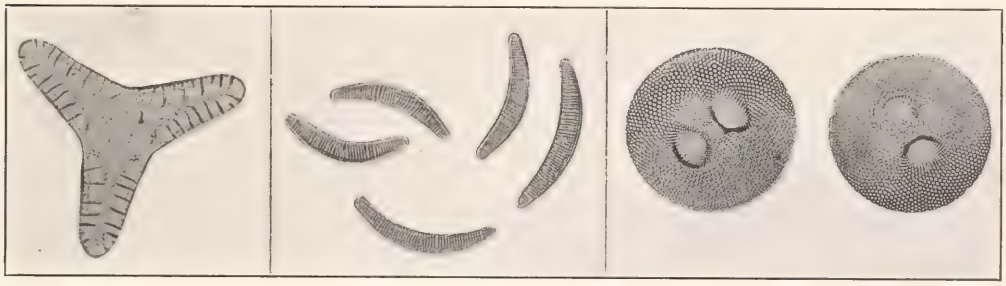


Fig. 4. Fig. 6. Fig. 8.

DIATOMS.

Selected to show variety of form and of sculpturing.

many miles in extent. The city of Richmond has underlying it such a bed of fossil diatoms thirty feet thick. The artesian wells of Atlantic City, at a depth of five hundred feet pass through a similar deposit, as the researches of Mr. Lewis Woolman have shown. Other beds of such plants are known in Maryland and in New Jersey, while certain deposits in California and in New Zealand, are world-famous among microscopists as containing genera and species not yet found elsewhere.

In such places these much varied forms lived and died by the billion, for it must be remembered, that while individually a diatom is, in ordinary circumstances, invisible to the naked eye, yet in these beds of diatomaceous earth, the number of such plants is so enormous that their dead shells have formed a mass which in aspect resembles grey stone, and must be laboriously dislodged by the shovel and the pick. It has been probably in some way stronger, will continue to press against the obstruction until it is removed, when the plant serenely resumes its journey.

The cause of the movement is not well understood. Many theories have been offered to explain it, but none is entirely tenable. It is said to be due to the injection and the expulsion of water; to the movements of a thin, fluid mass on the surface of the diatom and in rhythmical motion; to "the changes resulting from the nutrition of the cell, which must necessarily absorb food in a liquid condition," and perhaps to still other causes. Some adherent forms, similar to those referred to by Professor Bailey at West Point, become motile when separated from their point of attachment, a fact that seems to militate against the theory that nutrition is its cause, for the adherent forms, as well as those that are permanently free, must likewise absorb liquid food. Mr. Cornelius Onder-

donk, who has suggested the presence of the external fluid layer, whose motions result in the movements of the diatom, says that he has artistically stained this protoplasmic coating, and has, after its death, actually seen it curl up and become separated from the body of the cell.

The structure of these remarkable plants is much like that of a pill-box, to which it has often been compared. The entire cell, which is referred to by microscopists as the frustule, consists of two layers that he calls the valves, and which imperfectly correspond to the upper and the lower surfaces of the box. Delicately connected with each valve is a band of silica called the hoop, and roughly compared to the sides of the pill-box which are attached to the lid and to the body. We may then form a mental picture of a diatom as a usually flattened case of silica, the hoop of the valve on one side fitting loosely into the hoop of the opposite valve, much as the side of the lid slips over the side of the box.

It is known that "one of the valves is always older than the other; and the hoop of the older valve partly encloses that of the younger. As the newly formed cell increases in length, separating the valves from one another, both hoops increase in breadth by additions to their free edges, and the outer hoop slides off the inner one, until there is often but a small 'overlap.' As growth and binary division are continually going on, . . . it is rare to find a specimen in which the valves are not in some degree separated by the interposition of the hoop."

The contents of these diatom boxes are an exceedingly important nucleus, the colorless protoplasm, and the yellowish-brown coloring matter. Although a diatom is a plant, a green diatom does not exist. If the microscopist, therefore, finds under his instrument, a motile green object, he may be sure it is not a diatom. Color and movement are not distinguishing characters of microscopic animals, but, other things being equal, they may become distinguishing features of a diatom.

Reproduction is accomplished by two, some microscopists say by three distinct methods, and is in each instance complex. The one most frequently observed, and perhaps the simplest, takes place by the division, into two parts, of the protoplasm within the frustule. Each of these parts retains one of the old valves on its outer surface, and each of the two inner surfaces then secretes a new valve, two new individuals thus being formed, each with one parent valve and one young valve, so that every diatom frustule is usually partly youthful and partly aged, a condition much like that obtainable by building a new house under an old roof.

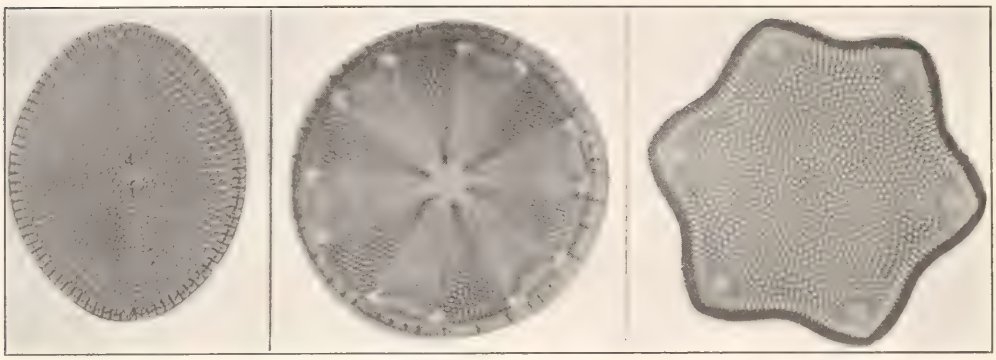


Fig. 7. Fig. 9. Fig. 5.

DIATOMS

Selected to show variety of form and of markings.

THE CAMERA

KODAKING AQUATIC FOWL.

BY GEO. W. KELLOGG, ROCHESTER, N. Y.

With the single exception of high-speed work, there is little in nature photography, that cannot be done with the regular folding kodak equipment, which can be procured at a price within the reach of the average amateur; while



No. 2 No. 1.



No. 3. No. 4.



No. 5. A NEAR VIEW.

with the box type, and even with the brownies, much can be accomplished along the same lines, and the same is true, if any of the other hand cameras, so called, is employed, notwithstanding all opinions to the contrary by some presumed to be authorities; and one of the easiest divisions of this work is the photographing of domesticated water fowl

All of the accompanying illustrations were made with a 4x5 kodak: No. 1, of Canada Geese, was obtained shortly after sunrise; 2 and 3, Chinese Geese, were secured at the feeding place, and just before the arrival of breakfast, as was also No. 4, showing the swan in the foreground. All were snap-shots made at a distance of six feet from the subjects. No. 5 was a chance find. At the base of a large elm, and partly concealed by the tall grass, was a white duck which absolutely refused to leave her nest, although the camera was so set up that the distance from the front lens to the



A GOOD SNAP SHOT.

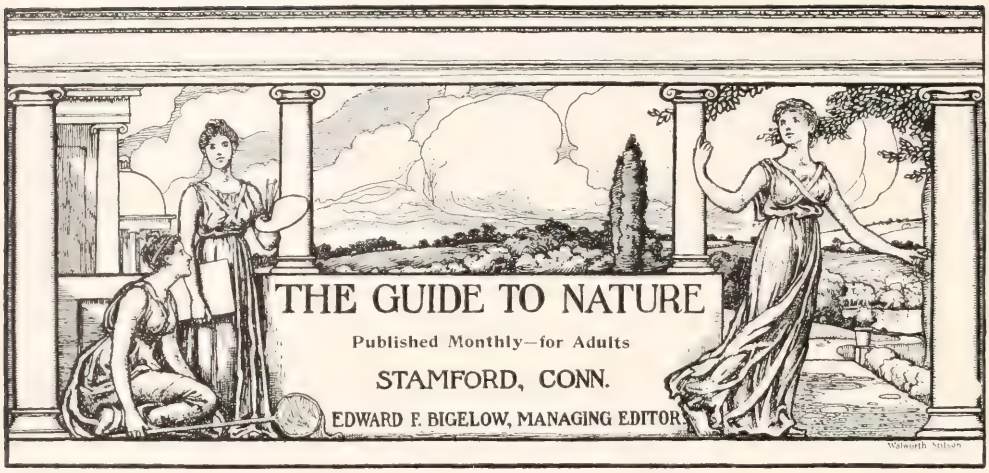


THE LILY AND THE FROG.
Photograph by George W. Kellogg.

duck's head was exactly 28 inches, the distance being measured with a tape measure, the exposure being made possible at that distance without the extension of the bellows beyond the six foot mark by a fifty cent portrait attachment, which was attached to the regular lens like a cap; and by using this simple attachment the types of hand cameras ordinarily in use can be made available for much of the work which formerly necessitated a camera with an extra long draw.



A DECORATION OF PURPLE FRINGED ORCHIS.
Specimens from George Park Singer. Photograph by Edward F. Bigelow.



CALL FOR COUNSEL.

For six months THE GUIDE TO NATURE has steadily travelled onward, and led its followers into a wilderness, of nature not altogether unknown, yet not previously explored by its method, nor guided from its point of view. Now the leader calls a halt, to consider certain matters, to look about and make plans for the future.

To speak less figuratively, this magazine has been trying to take possession of an unoccupied field in periodical literature—the uncommon interest of commonplace nature. Now we ask counsel of our readers. In what direction have we travelled most successfully and where have we met obstacles and failed to overcome them? What article or what illustrations have best pleased you and what do you most wish to see treated in the future? Will every reader please write at once? We want your immediate advice. Already some departments have been dropped, and important new plans are under consideration. This changing of plans is not of trial and failure, but in the multiplicity of good things it represents the survival of the best.

We also ask your co-operation in making the magazine widely known. Tell your friends about it.

But more than all, do not neglect to write and to write at once.

TOO "GOOD" FOR US.

When you write a long, descriptive article, with highly polished, well rounded and evenly balanced sentences, exhaustively covering your subject from A to ampersand, and you say in your heart, "That would grace the pages of any large, general magazine, but I will be self-sacrificing and send it to THE GUIDE TO NATURE, 'just to help it along' in its growing days,"—please do not make the sacrifice. We are not a general magazine and we do not want that kind of an article.

When you see something in nature really new and of "uncommon interest," though you can describe it in five words, please, let us beg of you, send it to us. There are thousands of writers to one observer, and there are a thousand persons who can prepare an elaborate description for one who can see a simple thing and describe it clearly.

Push out into the wilderness. Leave the beaten track. Help us to be really a "guide."

KNOWLEDGE FOR ITS OWN SAKE.

I recently visited a technical student of science in his laboratory.

"Are you working to ascertain new facts or to prove some hypothesis?" I inquired.

"Both," he laconically replied. And he went on to add, after a few moments of careful attention to a difficult matter in hand, "A real scientist is as

much interested in getting facts as in proving a theory. Nature is of more account than one's own personality."

A little later I again inquired, "Does your work have in contemplation any improvement or benefit to mankind?"

"Brains, yes; stomach, no."

"So you regard brains as of some importance?"

"Yes, although most people do not. They have reference only to pocketbook or stomach when they inquire, 'What's the use?'"

Again for several minutes close attention was given by us to the work in hand. Then he paused, as if to rest, straightened up and said, "I hope you sympathize with the scientist who at a banquet gave this toast, 'Here's to pure science! May it never benefit anybody.'"

Of course he used the term benefit in the sense of the physical anybody.

* * * *

Isn't an interest in nature, in this madly utilitarian age, of greater value, the less its "use?"

GOD'S WORKS.

It is really true that "The heavens declare the glory of God; and the firmament sheweth his handywork." To one who appreciates this fact, it seems also true that the "declaration" and the "showing" are better by this method than by any other.

Then, why does it not logically follow in actual practice that one of the principal equipments of a church should be an astronomical observatory? Perhaps it will be so in the Twenty-first Century. The most important truths to the human race come into actual practice and full appreciation only after long, long periods of time. Strange, isn't it, that we flounder so long in positive error or in partial truth.

Strange, too, isn't it, that the church gives so little heed to that authoritative and valuable command to "consider the lilies of the field."

The Great Naturalist Teacher drew most of his lessons from birds, flowers, wilderness, mountains, gardens and farms. Perhaps His very best, at any rate one that has done more to reclaim sinful man than any other, was his story of the farmer's wayward son who looked after the corn and the pigs. And yet such actually existent things, hallowed and sanctified by divine authority, are too often regarded as materialistic, misleading or secular.

It sometimes seems to the writer that many of those who most insist on taking the Bible literally, themselves accept it figuratively or not at all. Perhaps the most marked example is the fact that in the very opening chapters of the Bible the ideal existence of man and woman is in a garden. Many of the best people of the Bible were shepherds, farmers or



"FOUND THE BOYS AND THE GIRLS AS HAPPY AS THEY COULD POSSIBLY BE, AND REJOICING IN THE GREATEST OF ALL JOYS, THE JOY OF DOING."

gardeners. The Principal Lover of Nature spent much of His most sacred time in a garden, and whenever that Great Book wishes to enforce an important lesson, it portrays its actors near to some form of wild nature or intensely interested in animal or plant life, with especial reference to plant life that is natural world. He believes practically in a garden, and he has successfully conducted in the church grounds a veritable Little Eden for the boys and the girls. His example is worth imitating. It will be imitated. The time is coming when every church with children in the parish will have a garden.



THE MANAGER AND THE DELVERS OF "LITTLE EDEN."
The photograph shows a liberal harvest of "good things" in vegetables and happiness.

under the care of man—in other words, a garden.

In view of these self-evident facts, looked at as they are and not through the heedlessness of custom, isn't it astounding that the majority of churches take no interest in gardens?

Yet I know one rector to whom this criticism would not apply, and who is setting an example in the study and appreciation of "God's Works" that may well be imitated by others. I refer to the Reverend Charles Morris Addison, rector of St. John's Episcopal Church, of Stamford, Connecticut. As a boy he met the great-hearted, thoughtful, religious, studious and prayerful Louis Agassiz. He has been an active worker in several AA chapters. He interests his boys and girls in God's Works as well as in God's Words. His sermons are permeated with the beauty, interest and instruction to be derived from the

I recently visited this little Eden and found the boys and the girls as happy as they could possibly be, and rejoicing in the greatest of all joys, the joy of doing. I took the accompanying photographs. Upon request the manager of the garden furnished me with the following account:

The farm garden of St. John's Boys' Club was started on the 25th of May, 1907, and was continued for four months. During that first season we had sixteen members, and the interest and enthusiasm shown were most encouraging. Each member had a plot of ground ten feet wide by twelve in length, on which he raised not less than three and one-half dollars' worth of vegetables. In 1908 we hope for an increase in our produce, as tomato plants have been added to our list, the vegetables now cultivated being wax beans, string beans, lettuce, radishes, turnips,

carrots, beets, Swiss chard, parsley, and tomatoes, the turnips and the carrots following the lettuce and the radishes. A border of flowers ornaments both ends of the lot.

For the use of the ground during the entire season, each child pays twenty-five cents, at the rate of two cents a week in cash, or an equivalent in vegetables to be devoted to certain charitable purposes. This rent, small as it is inspires a feeling of ownership and has an excellent effect.

This season (1908) the garden opened on the 15th of May, with twice as many applicants as there were plats of ground. Our lot is so small that we can have only nineteen gardens in all, yet we have a reserve space for flowers and for specimens of such cereals as wheat, rye and oats. The flowers are given to hospitals and to other charitable organizations.

Our expenses during the first year, chiefly for tools, plowing and fertilizing, were forty dollars. For this season they have been only twenty dollars.

An exhibition is held in the autumn and prizes are given for attendance, for general efficiency and for the best kept garden.

It is interesting and often amusing to observe evidences of the children's character as shown by their gardens. To the expert a glance reveals the impetuous, the untidy, the careless; while the methodical, the neat and even the prim and "old-maidish" are as plainly apparent.

There can no be doubt but that church gardens are beneficial physically and mentally, and that they may also be made permanently valuable in a religious way is a foregone conclusion.

HUNTING EXTINCT ANIMALS IN ALASKA.

A zoological expedition to Alaska, sent out last season by the Smithsonian Institution, has brought back, besides interesting information many osseous fragments of extinct animals that once lived there. The specimens show that over the Alaskan fields at a period long before man arrived on earth, roamed mammoths, several kinds of buffalo, musk-oxen, sheep, moose, caribou, horses and bears. Beavers also built their dams along the rivers.

Ever since Otto von Kotzebue, nearly a century ago, brought back from Alaska a few pieces of skulls and bones of strange extinct beasts, men of science have looked upon that region as a possible source of information concerning the early ancestors of our northern American animals. Little systematic work was done, however, until 1904, when the Smithsonian Institution sent out its first expedition, followed last season by a second, which pursuing a certain itinerary, was to search for the remains of extinct vertebrate animals and to investigate the causes leading to their extinction.

The party was gone for about four months, during which nearly the entire length of the Yukon river was covered and several of its tributaries partly explored. Close upon fourteen hundred miles of the distance was covered by canoe. During the whole time search was made along the cliffs and in the river bars as being the places most likely to show relics of early beasts. Mining camps were also visited for possible traces of significant bones. The rapids of the Yukon having been passed, Fort Gibbon is reached, below which lie the now well-known "Palisades," called in that region the "bone-yard," as from it have been dug broken remnants of many early beasts.

The party paddled on, however, in search of larger game, and at the mouth of the Nowitna river information gained from an intelligent Indian, that he had seen "big horns and other big bones" on the river bars and had picked up the "shank bone of some large animal, lured them into a side trip up the river.

It is a picturesque region. "Often the water has cut in under the bank," says Mr. Gilmore, the leader of the party, "which extends out over the stream like a great shelf. The trees growing on these undermined banks frequently lean far over and dip their tops in the water before being carried away. Large blocks of the bank, covered with bushes and trees, cave off into the streams, where

they remain standing half submerged for a long time. Frequently there hangs down from the top of these undermined banks a mantle of moss which serves as a curtain to hide the destruction the waters have wrought."

The party struggled up the Nowitna river for nine days, hunting for the source of all the pieces of ancient bones found washed down from somewhere above. No settlers were met with, and only an occasional deserted winter cabin of a lonely trapper showed that man had ever scrambled along the banks or pushed a paddle in the stream. Food began to give out, so that they were forced to turn back before reaching the headwaters. The side trip, however, was not without results, for from nearly every bar searched was taken a fragment or a complete element of a skeleton representing such extinct forms as the mammoth, bison and horse.

It was found that the scattered remains of the very early animals occur throughout the heart of Alaska not constantly covered by ice and snow, in three quite distinct deposits: First, in the black muck accumulated in the gulches and valleys of the smaller streams; second in the fine elevated clays of early origin, known as the Yukon silts and Kowak clays; and third in the more recent deposits along the banks of streams. These specimens have been either washed out by the process of erosion or else dug out by miners in search of gold.

In connection with the "bone yard" of the Palisades, and with Elephant Point farther north, it has been thought that there might be enough ivory in old imbedded mammoth tusks to pay for its excavation and shipping for commercial purposes, as is the case in some localities of Siberia. In fact mammoth tusks for a good many years have been an important Siberian export. But the Alaskan remains are not in as fresh a state of preservation, and until a few years ago, it is said, a man would not take a tusk as a gift. Now they are used to manufacture curios of different sorts.

How the ancient animals died, has been a subject of speculation. Some have believed that they met their end on the shores of glacial lakes, and their bones, carried out on the ice in the spring break-up, were dropped here and there as the ice melted, becoming imbedded in the silt. Mr. Gilmore, however, believes, since the best specimens have been found in gulches and valleys of small streams, and are more common in muck than in silt, that these animals became mired in prehistoric bogs, not then frozen, and were afterwards separated by the "flowing" or "creeping" of the muck.

CORRESPONDENCE AND INFORMATION

SUNSET ON LAKE HURON.

Pittsfield, Massachusetts.

To the Editor:

The photograph, "Sunset on Lake Huron," in the August The Guide to Nature recalls the outing we once took at Goderich, Ontario. In the following sonnet Mrs. Ballard tells what happened as she and our four-or-five-years-old little Julia stood on the high bluff watching the sunset.

Very truly yours,
Addison Ballard.

Huron's blue waters oped their trembling lips,
And swallowed up the round, red evening sun.
"Think he will rise again, my little one?"
I asked, as, gazing 'twixt two wandering ships
Where he had disappeared in strange eclipse,
My little girl stood silent as a nun.
The moment's fear gave place; sweet faith was born;

"Yes, he will come again to-morrow morn;
He *always* comes to us with morning light,
No matter *where* he falls asleep at night;"
And so she clapped her hands with joy, to trace
The rosy veil upon the water's face,
Which rosier clouds, free floating far above,
Threw down in parting token of their love. JULIA P. BALLARD.

MOVING HUGE PALMS.

San Francisco, California.

TO THE EDITOR:

Of the two Wine Palms of Chili that I recently removed from Redwood City to Santa Cruz, I am sending you three photographs under separate cover.

One shows the two palms as they stood when the workmen were just starting in to excavate for the purpose of removing the large palm. These palms had only been planted about three years, as I removed them from San Mateo to Redwood City about three years or more ago. The second picture shows the smaller palm out of the ground, laying on its side in a box for shipment. This palm stood with the frame around it about thirty feet high. The ball was sixteen feet square and about six feet deep. The third photograph shows the larger palm just raised out of the



THE PALMS AS THEY STOOD AT REDWOOD, CALIFORNIA, BEFORE REMOVAL TO SANTA CRUZ, CALIFORNIA.

ground and partially boxed. Before shipping we completed the boxing of the top. This palm stood with the box a trifle over sixty feet high. The ball was sixteen feet square and about seven feet deep. This, in turn, was laid on its side by house movers. These two palms were then taken and put on separate cars —the larger one taking two cars—and sent to Santa Cruz.

A temporary spur track was run from the railroad into the lot and right into the hole prepared to receive the palm, so that, when the car came to rest, it stood at an angle of about 45 degrees, making it much easier to raise and set the palm in place.

I am pleased to report that these palms were planted at Santa Cruz, and are now entirely out of danger, and do not look as though they had been moved, for they have both made fresh roots and new leaves, and the larger one is now throwing out fruit pods. The fruit is very similar, only in big bunches like bananas, to a miniature cocoanut. These palms weighed forty and fifty tons respectively when they were boxed for shipment.

Hoping that these pictures reach you in good condition and that this brief history of these palms will interest you, I am,

Yours truly,

WILLIAM J. DINGEE.

NATURE INDOORS

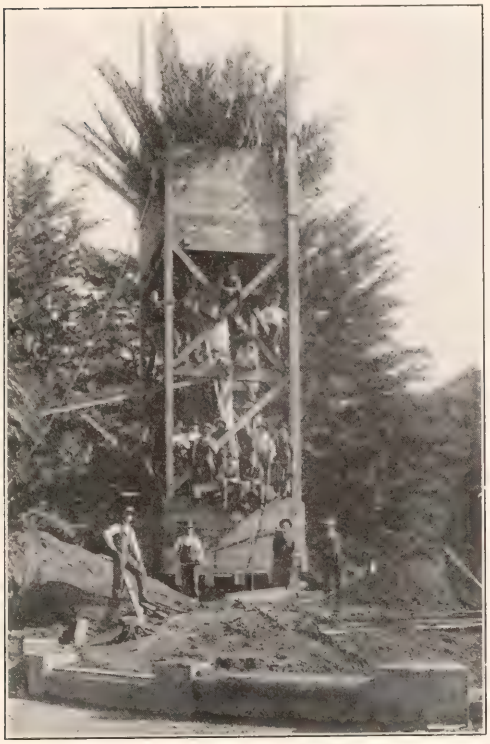
Hackettstown, N. J.

TO THE EDITOR:

I love the daisy fields and the woods; I love the birds, the brooks, the trees; I love the stones rich in velvet moss and even the leaf-mould on the ground. As the way has not opened for me to sleep in this paradise, but only to visit it in my waking hours, I have converted my room into more or less of an Eden. While it is possible to accomplish this with a very small outlay, I must confess



SMALLER OF THE TWO PALMS BOXED FOR SHIPMENT TO SANTA CRUZ.



THE LARGER OF THE TWO PALMS PARTIALLY BOXED FOR SHIPMENT.

that I was favored by having for a background to my plan a very dainty and rather expensively fitted room.

In having the bay window run up to the second floor where my room is situated, I had the shape changed from the conventional bay of the story below to a square-cornered window to allow of a window-seat long enough for reclining. As I needed more book space I had a bookcase built in at either end of the seat. What would have been the lower shelf in each case was changed to two short drawers to avoid bringing the glass doors too low. The window-seat and bookcases are of birch and the floor of oak with a beautiful inlaid border. The large space between the window-seat is a very convenient place for storing my nature magazines, camera, etc. The little drawers seem as if made for my bird magazines, and among my books one will find information on trees, flowers, shrubs, mosses, ants, bees, and volume after volume on birds, my dearest hobby.

The room is blue and white and is not beruffled, but made up on the simple plan of straight lines. The paper on the sidewalls is blue, the white ceiling paper coming down to meet it at the moulding. There is no border except in the window. For this I obtained from one of the department stores a ravishing strip of barn swallows. I bought more than enough for the window, and cut out the birds for a little flock on my white sidewall border. These I placed in a little overflow group on the short side of the wall to the corner, then as they flew along the long side of the room I placed them more scatteringly until I fixed one bold leader making for the next window as if to regain his freedom. The other two sides of the room have no birds.

Two of the window cushions are filled with the silky down of the milk-weed pods; another contains the delicious hay-scented fern, and the fourth sweet balsam. I have here and there over a picture a dainty vireo nest on its branch, and over the door some weathered sprays of pitch pine, with the gray cones still clinging to them. The tiny home of the redstart graces the corner over my bed, and with a bunch of rabbit-foot



"I HAVE CONVERTED MY ROOM INTO MORE OR LESS OF AN EDEN."

clover behind a wee picture and some branches of black alder with its scarlet berries above my precious books I could almost believe myself in Nature's blessed grasp.

MARY PIERSON ALLEN.

NATURE AS OUR GREATEST EDUCATOR.

Tuskegee Institute, Ala.

TO THE EDITOR:

I had the good fortune to be born in the southwestern part of Missouri, on a



PROFESSOR GEORGE W. CARVER.
Director Department of Agricultural Instruction and Experiment Station, Tuskegee Normal and Industrial Institute, Alabama.

farm, where nature had, in a most lavish way, touched the surroundings, and made them unusually rich in the things that please the eye and furnish food for thought.

The great limestone crags were full of crinoids, brachiopods, bivalves, corals, and other interesting formations.

The immense springs, with their never failing streams of crystal, ice-cold water, a veritable nectar of the gods to the thirsty traveler, were in evidence everywhere.

One of the happiest moments of my life was when I became sole possessor of a little piece of ground for a flower and vegetable garden. With what delight and enthusiasm I watched the little plantlets emerge from the ground, despite the fact that daily pilgrimages were made, and many of the seed uprooted to see if they were sprouting.

Possibly the strangest thing of all was that almost everything I touched grew, whether I planted it out in the open ground or put it in pots; this soon became known, and sick plants were brought by the score, and left for treatment, and I often went to houses, and prescribed for them, much as a physician prescribes for his patients. Sometimes a change of soil would be recommended, more or less water, a shady spot, more sun, pruning, etc., as the case demanded. I do not remember of ever losing a plant brought to my "sanitarium."

I soon earned the name of "Plant Doctor."

I wondered how the roses became double, why leaves were different, in color, form, etc., why the clover, and the oxalis folded their leaves at night and on dark days, also what the insects were doing in the flowers. I longed to be able to mix flowers, as I called it, and in my little garden the varieties were all planted together, hoping they would mix. I was not wholly disappointed in this, much to my delight and pleasure.

Would I ever know what the rocks were made of, and why this soil was red, and that one black, yellow, or mottled? This task seemed Herculean, but I said, others have found out, why not I?

Thus as I grew older and began to study, my love for all forms of nature increased. Indeed animals, plants, minerals, and insects are my friends. Never a day passes but that I do myself the honor to commune with some of their varied forms. And when tired and weary with the duties of the day, I hie away to the woods, and fields, if possible, stay an hour or so, and return, much rested, after asking Mother Nature a number of questions which she so willingly answers; otherwise, how am I to undersand: "Behold the lillies of the field, they toil not,—" or "Look unto the hills from whence cometh—," or

"Go to the ant, thou sluggard, consider, etc,—."

I am an artist by taste, training, and profession; therefore nothing pleases me more than to take my pencils, paint, brushes, sketch book, pastel board, etc., and spend a day in the woods. I am now painting a very large picture (3½ feet x 6 feet) of the exquisite *Yucca Gloriosa,* with *Opuntia ficus Indica* clustered at the base, all with scenic background; how it thrills my soul as the great spikes of blooms with their hundreds of beautiful bell-shaped flowers develop.

Flowers are my constant companions, the lapel of my coat never being without some form of decoration.

To those who already love nature, I need only to say to you that I hope you will, through THE GUIDE TO NATURE, give us the value of the answers to the many questions asked Mother Nature.

To those who have not yet learned the secret of true happiness, the joy of coming into the closest relationship with the Maker and Preserver of all things: begin now to study the little things in your own door yard, going from the known to the nearest related unknown, for indeed each new truth brings one nearer to God.

GEO. W. CARVER,
Director Agricultural Instruction and Experiment Station, Tuskegee Normal and Industrial Institute.



DOMESTICATED NATURE



JOCKO AND I.
Photograph by S. S. Place.

PEOPLE AND CATS.

BY C. H. JONES, EDITOR THE CAT JOURNAL, ROCHESTER, N. Y.

I divide those who are interested in cats into four classes, Cat Lovers, Cat Likers, Cat Tolerators and Cat Haters. opinion, both. The cat lovers, strong in the love for the animal, move along in the even tenor of their way and care not at all what others may think.

The "Cat Likers" admire them when they are in perfect condition, and in



MAID OF AVENEL'S KITTENS.
Sired by Sir Friar. Sire and dam owned by Mrs. D. S. Lovejoy, Elgin, Ill.

The "Cat Lover" likes them in any style, any age and in any place. A forlorn, starving kitten on the street, appeals to them, and they are not satisfied until it has been relieved from its distress. They are fond of them all, whether long or short-haired, "Persian," or what is known as "common." To those who do not like cats this individual is either crazy or a fool, and perhaps in their what they call "their place." They like to see them sitting by the fireside as an ornament. They would not pick one up on the street or notice it in any way and would not handle one if it were indisposed. If their pet is taken with any sickness their first thought is to have it killed so they will not be distressed by the sight of it.

The "Cat Tolerators" are a class that



CAESAR OF KENNELWORTH.

endure them because they are so unfortunate as to be related to some one who admires them and they cannot help themselves, so they endure with impatient and often expressed disgust that which they cannot help. They will have one to rid the house of mice in case of necessity, but that is as near as they will ever admit that they are of any use.

The "Cat Hater," generally claims that dislike and hate are inherent. This dislike might be overcome, but the trouble with this class of individuals is they have so led themselves to believe that they cannot help it that they will not try. They hoard this thought as if it was something to be desired. They transmit it to their children, and encourage it in them. They make vicious remarks on the subject and if they had it all to say no cat would be allowed to live on earth.

For the variable emotions in the minds of the "grown-ups" regarding animals, and especially cats, parents are in a large measure responsible. Most children like anything that reminds them of a doll or baby and are usually attracted to animals. If this, much to be desired attribute, is encouraged they will become men and women who are disposed to have some interest in animals and who

will, as a rule, be kind and considerate of their feelings.

That child is to be pitied who is not allowed to have a kitten and a dog and who is not taught by those who have the forming of their character to treat it kindly and lovingly. It is a rare thing to see an animal lover who is not kind and careful to human beings, when helpless either from sickness, misfortune or age. The child who is taught to have consideration for those of the animal kingdom will be kind to their parents when they are old and need attention and care.

It would seem much better for the child to have a living companion like a cat or a dog upon which to lavish their affection rather than to give it to a doll or a Teddy Bear. Not that we would deprive them of these inanimate objects, but we would add to their family, living pets.

In character there is but little difference between the long-haired or Persian cats and the short-haired or domestic cats. They are all cats, but one has longer hair. The character of either depends largely on ancestry and condition of birth, as it does with a human being. If the parents are wild the kitten is quite sure to be wild.

The Persian cats are by many called Angoras, which is wrong, as an Angora is something quite different. There are probably very few if any in this country.



FAMO.

Winner of a First, Second and Special, New York Show. First time shown.

The Persian type is much more to be desired. When one calls their long-haired cat an Angora they are calling it something that is much inferior to a Persian.

Cæsar, as shown in the illustration, is what is known as a Silver Persian. If we were to describe the color to one who has never seen a silver we would say it is much the color of a very light gray horse. The very lightest ones are called chinchillas and are shaded but a little from white. To reach the standard they must be without stripes or tabby markings. Cæsar is a noted show cat, and has several times won the special prize for Best Cat in the show of any color. He is the property of Mrs. William Frye, of Buffalo, N. Y.

Famo is another noted prize winning Persian, white, very affectionate and loving in disposition. He is owned by M. Johnson, New York City.

The three kittens are from noted Persian parentage and have their lives yet before them. Whether they will make a name as noted winners or find a home with some cat lover as a pet is yet to be seen. They were bred and are owned by Mrs. Lovejoy, of Elgin, Ill.



THE BUZZING SILVER.

Silver tabby shorthaired female lately imported. Bred by Mrs. Collinwood, England. Owned by Mrs. J. C. Mitchelson, Tariffville, Conn. Sire, Champion James II, dam, Sally Ugly Mug.

The Buzzing Silver is a very beautifully marked shorthaired cat imported from England by Mrs. Mitchelson of Tariffville, Conn. While Buzzing Silver has been in this country but a short time, she has already won many prizes. Three times she has won as the best shorthaired cat in the show. She would be called a silver tabby. Tabby because she has the stripes and silver because the ground color or light colors are silver.

LITERARY AND BIOGRAPHICAL

Microscopy the Construction, Theory and Use of the Microscope. By Edmund J. Spitta, L. R. C. P., Lond., M. R. C. S., Eng., F. R. M. S, President of the Quekett Microscopic Club, author of an Atlas of Bacteriology: With 47 Half-tone Reproductions from Original Negatives, and 241 Text Illustrations. New York: E. Dutton & Company.

This book is a delight to those who, like Prof. Douglas in the July number of "The Guide to Nature," would restore and increase interest in microscopy.

The frontispiece, a beautiful photo-micrograph of the proboscis of a blow-fly, is exquisite in detail. The plates of diatoms and other test objects deepen our gratitude to those workers who perfected that marvel of lenses—the microscope objective. Some of the best things of the book are in the inconspicuous department "Hints" in the last part of the volume.

The Study of Nature. By Samuel Christian Schmucker, Ph. D., Philadelphia: J. B. Lippincott Company (Educational Series).

This is a book of pedagogical nature study, dealing with principles, methods and materials.

The author is a true teacher and naturalist, and the book contains valuable suggestions and instructions.

I received the book while sitting before a large number of teachers at an Institute. I handed it to a colleague instructor who is not a naturalist He at once severely criticised the first sentence—"Nature study is the study of nature," as "Absolutely foolish and meaningless, going around a circle and not getting anywhere" We who are naturalists know what the author has in mind of genuineness versus sham. We know that there is a "nature study" that is fizz. Yet some of us, who best appreciate Professor Schmucker and know all he meant by that trite and laconic sentence, can but regret that he has not defined a sharp distinction between the pedagogical "nature study" and the strict "study of nature" or natural science.

However, it is not so very important what we call it nor how we define it, but rather how we do it and how we live it. The author does, lives and studies all right and his wife helps him well in all—especially in the illustrations of this book.

"American Birds Studied and Photographed from Life." By William Lovell Finley. Illustrated from photographs by Herman T. Bohlman and the Author. Charles Scribner's Sons, New York, 1907. $1.50 net.

For some years past the observation and study of birds has been growing in popularity. That this interest shows no sign of waning is evidenced by the steady successions of interesting and finely illustrated books on the subject which are being published. Another worthy book in this meritorious succession is "American Birds," by William Lovell Finley. In order not to misunderstand the scope of the book, one must note the sub-title,—"Studied and Photographed from Life." It is not a treatise on the entire ornithology of America, but a series of sketches of twenty-one representative, well-known birds, as they were observed and photographed by Mr. Finley and his companion, Mr. Herman T. Bohlman, who does most of the photographing. These sketches are breezy, pleasantly written accounts of experience with the various birds afield, well adapted to interest young people, as well as older nature-lovers. The 127 photographs of birds from life, adult and young, and some of nests and eggs, are all well done, being, like all good bird-photographs, instructive as to the life of the subjects and also suggestive of the pleasure to be found by anyone who will go afield with the camera in the same spirit and do the hard, patient work required to obtain such trophies.

Mr. Finley is personally known to the writer of this review. A young man, resident on the Pacific Coast, he has rapidly come to the fore, and is widely known for the splendid and spectacular photographs which he and Mr. Bohlman in company have secured. He is a tireless enthusiast, and no amount of hardship or danger deters him from succeeding in his quest. Certainly he has the true enthusiasm and love for Nature. Here is what he says in his chapter on the Warbler,—and he practices what he preaches:

"One cannot take a camera, no matter how expensive it is, and snap off good bird pictures during the spare moments of a busy day . . . but to be a successful amateur bird-photographer one has fairly to make a business of lying in wait for his subjects hour after hour, day by day, and maybe week after week. The reward of real success comes not in mere acquaint-

anceship with some feathered bit of flying life, but in real friendship; there cannot be the formality of a society call, but one should, by frequent visits, be well enough

The birds described in the book, though studied from the Western forms, are for the most part those widely distributed types known all over the United States, and the



"Granny"—a portrait of a half-grown Barn Owl.

acquainted to drop in at any time without interfering with the daily affairs of family life We must understand that a beast or bird is interesting for its own wild sake."

book is interesting and instructive to dwellers on the Atlantic side of the continent no less than to those in Mr. Finley's "stamping-grounds" of Oregon and California. This is his first book, and, having read it with

interest, we shall look forward to similar publications of his fine material dealing with rarities and with the water-birds, of which he has made many fine studies. He writes, and lectures too, from the modern humanitarian standpoint of bird protection, and is a valued addition to these forces for righteousness.

HERBERT K. JOB.

THE FADED FLOWER.

Oh little faded wild flower,
I have watched you where you grew,
And waited for the tiny buds
To spread their wings of blue;
Have wondered when the tempest beat,
And mad winds hurried by,
If such a frail, fair thing yet held
Its blue wings to the sky
And when the sun burned hotly down—
Thirst reigned on every side—
I wondered if my woodland flower
Had even this defied:
And even though the tempest beat
And though the sun looked down,
This little wand held bravely up
Its fair, frail azure crown.
But, faded on the wood path now,
Plucked by some thoughtless hand,
Thy blue lies faded and undone
Across the trodden sand
Oh, why, in this great world of ours,
With space unbounded still,
May not the wild flower live its life
Its mission to fulfill?

GEORGE KLINGLE.

THE AGASSIZ ASSOCIATION

[From The Stamford Bulletin, Stamford, Conn.]

DR. BIGELOW, OUR NATURALIST.

A VISIT TO THE LABORATORY ON GROVE ST. —REMARKABLE WORK DONE UNDER RESTRICTED CONDITIONS—VARIOUS FORMS OF LIFE UNDER INVESTIGATION—THE AGASSIZ ASSOCIATION SHOULD GIVE ITS PRESIDENT A LARGER EXPERIMENTING FIELD.

It can be safely and sanely stated that one of the most remarkable nooks in our city to-day is to be found on Grove street, the home of our well-known townsman, Dr. Edward F. Bigelow, whose reputation as a nature student, nature lecturer and interpreter of nature has gone far and wide. It is by no means strange that many people visit the place, and examine with deep interest the work that is done under conditions so contracted and confined. This, however, is explained by coming in contact with the man, the good genius of the place, one might almost style him wizard, in contemplating what he has evolved from his congested surroundings.

This is exactly, however, what indicates the real student. The ordinary man cannot accomplish much unless his surroundings are put in adaptable condition to his work, but the true exponent makes his environments bend to his purpose and achieves success where others would register failure. This is exactly what a representative of *The Bulletin* found when calling on the doctor recently at his home on Grove street.

We were informed that the gentleman was in the backyard, and thither repaired. In contact with our naturalist he opened up a flow of enthusiastic explanation that needed the closest attention to follow, and take all in as he conducted us from one little shanty to another explaining what he had done, and what he hoped to do. Out of the fullness of the heart the mouth spake, the recital being of absorbing interest and embracing varied features of practical effort. It was a definite and succinct illustration of "*multum in parvo*" and made one wonder how the worker had brought together so much in a small back-yard, for though Grove street is a desirable residential locality, its garden space is sadly encroached on, when a tithe of the work is attempted that Dr. Bigelow has laid out and has been carry-

ing through. Luther Burbank, of Santa Rosa, Calif., the remarkable genius of fruit and flowers, said of him, "In the lecture by Dr. Edward F. Bigelow one seemed to be taken right to the heart of nature in her most charming moods. Every listener was enthusiastic, and I most heartily endorse Dr. Bigelow as a master educator in the study of nature."

Could Burbank have been with us during the tour of the back yard, he would doubtless have been ready with a further endorsement. In the first little room were pets of various kinds. The photo-microscopic apparatus was also close by, the instrument enabling our friend to reproduce the fine pictures of nature specimens and the attractive enlargements. A glass cover is taken from a dish on which it stands, and we are told that certain moths are being studied there.

Out of one wooden hut into another, and forest trees are before us, not tall sentinels that pierce the skies, but tiny white pines coming from seed. Rose bushes springing forth from seed are also here, while the mimosa or sensitive plant is under experiment, too. Below, on one side, in a shallow tank, on the floor, are specimens of the various turtles of the vicinity, while from an obscure and hidden corner, an elongated white thing is put into your hand, which you are told is a turtle's egg. Then you are invited to examine a tiny turtle that is produced, while down in the tank a large snapper can be detected. As fitting companions for these, large bullfrogs are also seen, and they are certainly big fellows.

A covering is removed from somewhere else, and we are informed that a plant is being grown here in the dark for the purpose of investigation and experiment. At the same time, the naturalist explains that he is not bent on developing new species, but endeavoring to get at facts as they are, striving to acquire knowledge of natural things as they appear, and as produced around us. A snail den will also be found in this section of the nature laboratory, including the edible French variety, as well as native specimens.

Passing into the very restricted territory of the garden proper, we find clumps of dahlias, learning to our surprise that last year there were no less than 104 distinct species here. The seed and bulb bill for this small garden amounted to some $85.00 last year. A few ears of corn will be found, too, but they are not for the house-keeper inside, they are devoted to experiment.

We re-enter the collection of shanties and are introduced to one of special significance and importance, the apiary department. Here for experiment and study are no less than thirty-five colonies of bees, making it probably the largest apiarian laboratory in the world, but our friend will be careful to explain that he is not trying to produce new species of honey bee. His is not the endeavor to show how bee-keeping can be made profitable. It is his work to furnish data regarding the wonderful character and powers of these busy little creatures, and so hives in this laboratory can be seen which reveal these things and interpret to the ordinary observer that which imparts surprise and delight. Our naturalist has invented two hives, one known as the "Pearl Agnes" and the other as "The Bigelow Educational Bee-Hive." The latter is a very thorough and complete instrument for the study of the habits of the bee and is a fine acquisition to any home.

From outside we were brought into the house, and in the naturalist's study found the same congested state of affairs. The lady of the house, who was in the room, explained that they were glad to take the opportunity of the absence of the presiding genius, to accomplish something in the way of putting matters in order.

Dr. Bigelow a short time since was chosen president of The Agassiz Association, and has entered enthusiastically into the work. That the choice was a wise one seems to be abundantly verified, but in order that the best results may be obtained, it appears imperative that further steps be taken to provide a plant and contributive conditions that shall enable him to much more widely develop his sphere of influence and secure correspondingly larger returns in the results achieved.

There has been no attempt in this notice to give a comprehensive digest of this nature laboratory. Mere allusion to a few things has been made, leaving description of the enterprise as a whole practically untouched. As president of the Agassiz Association, Dr. Bigelow receives no salary or emolument. On appliances he has invented for the prosecution of nature study he has no patent or royalty, hence spheres of labor of an honorary kind that take much time from the lecture field and literary work (the basis of his livelihood) should be laid out in a manner that will do justice to the leading worker himself and help forward the great cause represented.

Stamford is honored in having in her midst the leader of The Agassiz Association, in that from one of her printing establishments goes forth to the world every month a bright and readable magazine, the organ of the Association. The work laid out and defined is to open the eyes of the busy world to the beauty and symmetry of nature around, something absolutely necessary in these days, as a corrective and healthful stimulus in the dull and daily grind of things. In our townsman, The Agassiz Association has undoubtedly found its man. Let it now give him a showing in a fair opportunity to labor, as becomes the great organization which he represents.

VALUES THE AGASSIZ ASSOCIATION.

FROM CHARLES F. HOLDER, C. M. NO. 2041.

Pasadena, California.

My Dear Dr. Bigelow:

I have just returned from a trip to an isolated island off our coast (San Clemente) and find your letter of June 29th.

The Agassiz Association is certainly to be congratulated in securing your interest and leadership. To my mind there is no educational work going on in the country more valuable and far reaching than this. If it was not for this, a greater part of the work of zoologists (specialists) would never reach the public—the people. I have been familiar with the work of the AA since its inception, and no society has done so much to interest the masses of the people in nature and nature study and I should consider it in the light of a public disaster if this great work should not continue.

The study of nature in its broadest sense is to my mind an absolute necessity; it is a humanizer, a civilizer, a broadener and of the greatest importance to the public. I congratulate you on your work and can see in it great possibilities for the American people. Every town and village in this country that has a church should have an Agassiz Chapter. The very name is an inspiration and a spur to higher education. Wishing you every success, and assuring you of my hearty co-operation in any way you can suggest, I am.

Very truly yours,

CHAS. F. HOLDER.

HOW TO TEACH ONE'S SELF BOTANY.

BY PROF. CHAS. E. BESSEY, LINCOLN, NEB., CORRESPONDING MEMBER NO. 2004, OF AA.

The first requisite is a sufficient interest on the part of the learner. If he is not interested in knowing about plants, he surely will not undertake to learn botany without a teacher. If one has a good teacher who is full of enthusiasm, the teacher can be depended upon to keep up the necessary enthusiasm, but without a teacher, the pupil himself must bring a sufficient amount of enthusiasm to the task. I should say then that only persons who are already interested naturally in plants should think of taking it up without a teacher.

In suggesting some helps to such self-teaching, I may say that one of the first requisites is to accustom one's self to seeing things. I find that there is a great difference in what people see. Many a time when I take a walk with some of my literary brethren, they profess to be much astonished at the many things which I see while out of doors. This is simply due to the fact that for all my life I have been in the mood to see what is about me out of doors. So, as I walk along, I do not go with unseeing eyes, but as you might say, I commission my eyes to report to me whatever objects strike them. So, I rarely pass by anything of interest. This has gone so far that my wife laughs at my ability to find all sorts of lost things in the grass and along the paths on the prairie or in the woodland. I am not looking for lost pencils or pennies or even silver twenty-five cent pieces, and yet if they are before me I find them, and so as I walk I see the little mosses and tiny fungi as well as the big weeds, the shrubs and the trees. Probably the most important thing to be insisted upon in the self-teaching of botany is just this thing of noticing everything. Of course we call this observation, but I prefer to call it merely seeing things. If you want to teach yourself to know a good many plants keep your eyes open, even though you are walking with a friend who is talking to you on some entirely different subject. I find that I can commission my eyes to report to me whatever they see while at the same time I keep up a lively conversation on some entirely different subject.

It is quite advisable to make a list of the things one sees. Get a manual of botany which is suited to the region where you happen to be, and note down either in the book itself or in some handy little memorandum book, the names of the plants that you find. I had a very pleasant visit from an old gentleman a few days ago who had been doing this thing for many years. Every little while he finds a plant whose name he cannot make out, as he is not yet a very expert botanist, and sends me a specimen of it



and asks me to give him its name. I do so with much pleasure, as it generally takes but little time, and he then makes a note of the fact that he has had such and such a plant. Now some people call this a pretty poor kind of botany, but it is not. It is a part of the whole subject of botany and a part that lends itself most easily to this self-teaching. Furthermore it is sometimes said that such botany as this merely consists in getting the scientific names (Latin names) of plants, and that such a botanist knows little more about the plants than he did before. Yet there is much to be said in defense of the learning of plant names. It is a thing that we all do in one way or another. From early childhood to old age we always want to know the names of things. I meet a stranger as I take a walk, and I ask his name from the next acquaintance I meet. I see a tree which I do not recognize, and I ask my friend what he calls it. I see a new animal and I ask some one what it is. We must have names, and certainly there is no valid objection against the learning of the scientific names of the plants which one finds. So let the amateur botanist learn the names if he wishes to do so,—and I should hope that he would wish to do so.

I have indicated above one help which every isolated young botanist may receive, that is, help, from some professional botanist in his region. Practically every college worthy of the name has a chair of botany, and in nearly all cases these professors are willing to help those who write to them. Do not hesitate, therefore, to send your specimens to some one asking him to name it. Do not wait until you have a great many of them, but send the specimens one at a time, getting the answer on the return postal card, which you enclose.

Let me close this note by telling of my friend, the Rev. Mr. Blank, who formerly lived in a border town on the Nebraska plains. He was then, as he is now, a travelling minister, located at a particular place, but with many engagements which cause him to ride long distances over the prairies and plains. One January day, nearly twenty years ago, I received a letter from him enclosing two or three most wretched looking remnants of grasses. He had broken these off in a ride across the plains and had worked them out by the help of some manual as best he could. He sent his fragments to me and told me that he was beginning the study of botany, and wanted to know whether he had identified his grasses correctly. Thus he began the study of botany in the field in Nebraska in January when the blizzards are generally driving over the plains at a most lively rate. On looking over his specimens I found that not quite half of them were correctly named. Within a few days, I received another little packet of four or five specimens, and now the percentage of correct determinations was a little higher. And so week by week through the long, cold, stormy winter this travelling minister botanized over the Nebraska plains, collecting whipped out remnants of grasses, and gradually acquiring the ability to determine them with greater accuracy. Long before the wild flowers began to appear on the prairies, he was ready for them, and you can be certain that when he had good fresh whole specimens to work upon, he made his determinations with almost absolute exactness. I have always thought of my friend as rather a remarkable example of the fact that one can begin teaching one's self botany at any time, and while he chose a rather unpropitious time, he did succeed in learning one part of the subject. I may say that he has kept up his interest in botany to this day, and after he became thoroughly acquainted with all the flowering plants in his region, he extended his studies to the ferns, to the mosses, and the fungi, and even has done something with the fresh water algae. What this minister has done anyone with proper enthusiasm can do.

CHARLES E. BESSEY.



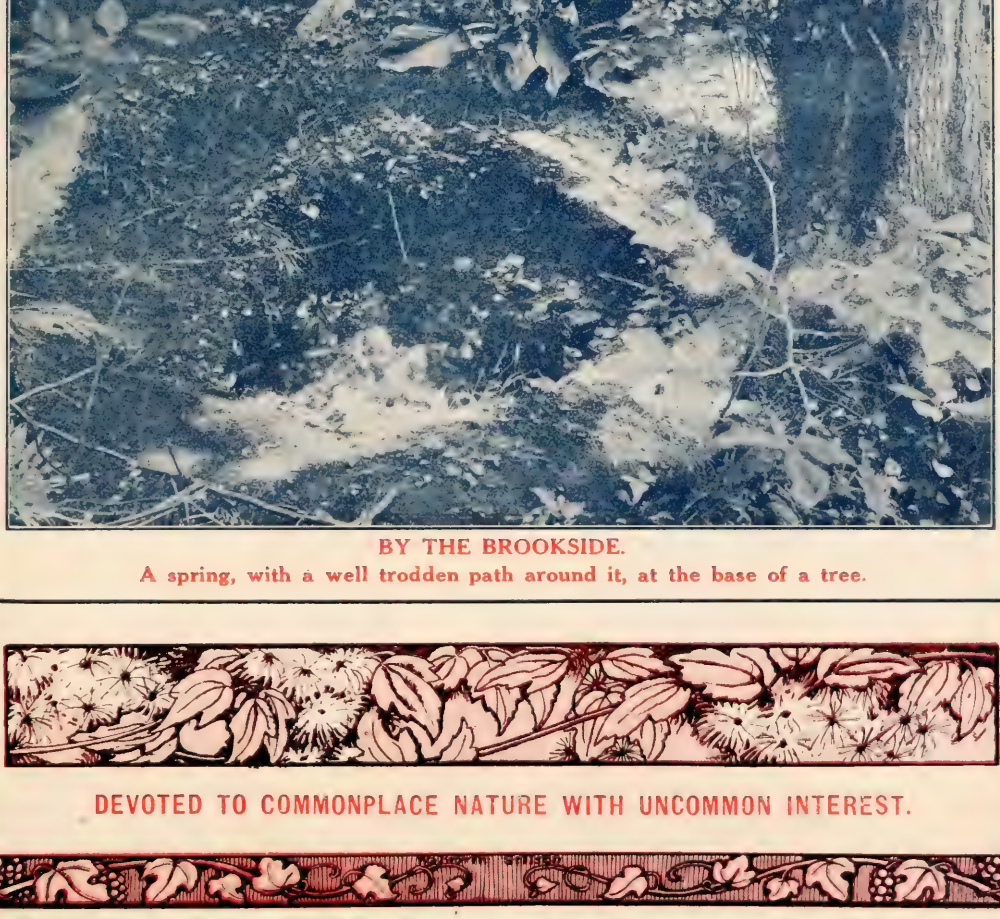




The Guide to Nature

Stamford, Conn.
Edward F. Bigelow, Editor.

Vol. I OCTOBER, 1908 No. 7



BY THE BROOKSIDE.

A spring, with a well trodden path around it, at the base of a tree.

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ADDRESS: **The Guide to Nature, Stamford, Conn.**



A PHOTOGRAPHIC STUDY OF THE DAM AND OLD SLUICE WAY.

Look for "circumstantial" evidence. What is there to show plainly that this picture was not a snap-shot in sunlight?

Photograph by Edward F. Bigelow with Zeiss Protar No. 0 VIIa made by The Bausch & Lomb Optical Company.



Go where we please in nature, we receive in proportion as we give.—Thomas Wentworth Higginson.



The Guide to Nature.

EDUCATION AND RECREATION

Vol. I | OCTOBER, 1908 | No. 7



Among the Trees in Southern California

BY JESSIE PORTER WHITAKER, PASADENA, CALIF.



ME of the east, before visiting California, are apt to think of it as a land of orange and lemon groves, of palms and banana trees. All these and more burst upon our delighted vision when, in the gray dawn of Thanksgiving Day, the Overland bore us from snow-bound mountain passes into summer land.

So soon does novelty wear off and the unusual become the commonplace—palms have almost ceased to interest us while the sight of a maple tree would awaken an outburst of enthusiasm. To a newcomer, passing through the residential streets of Los Angeles, the tropical growth in every dooryard is a striking sight. Scarcely a place, however humble, without its palm tree, and there is frequently a full grown date palm, its leaves all starting from the top of the trunk, arches in curves of wondrous grace forming a green canopy over the entire lawn.

To appreciate the value of the palms for landscape gardening, visit the beautiful places in Pasadena where, amid the broad expanse of lawns against a background of the sweeping date palm, are picturesque groups of smaller varieties. Here are fan palms, stiff but very tropical in appearance, their great fan leaves with ragged edges growing on straight, saw-toothed stems from the top of the odd looking, scaly trunks. Small specimens suggest an enormous pineapple

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DATE PALM AND FAN PALM WITH IVY GERANIUM.

bursting into foliage. It is common to see these trunks completely covered with the climbing ivy geranium, forming great bouquets of pink and green topped with a crown of fan leaves. The dark, glossy green of the English ivy also is used as a covering, and an especially pretty effect is that of several varieties of ferns planted in the crevices of the scaly trunks which form a charming background for the graceful fronds.

The Yucca palm is a very different species which, when planted in groups of three to six trees, gives a tropical effect. Its slim, smooth trunk grows straight up to a height of twelve or fifteen feet and then sends out long, narrow leaves in clusters, some hanging, others bristling straight up, suggesting a feather duster or the head of a Fiji Islander.

The *Neo-washingtonia filifera,* the fan palm most commonly seen here, is indigenous in the Colorado desert. It is, therefore, a native for all those found in California come from there and it must be remembered that the Colorado desert is—a large part of it—within the state of California. An Arabic proverb says, "A palm, to grow well, needs to have its head in the fire and its feet in the water,"—conditions nearly fulfilled in this desert where the temperature sometimes reaches one hundred and thirty degrees Fahrenheit. When the old leaves die and hang down, forming a covering for the trunk, the palm is described by the Indians as "a well dressed tree." They are left on the young trees because they preserve the moisture in the trunk, but the Indians had a custom of burning them off the old trees, believing that it made the fruit grow larger and sweeter. Even this fiery treatment did not render it palatable to white men. Doctor Wellwood Murray of Palm



A WELL-DRESSED PALM.

Springs says that the Indians had a ceremony of burning a palm on the death of a relative that, with its smoke, their prayers as incense might be wafted heavenward.

The trees which excite most admiration from newcomers in California are the orange, lemon and grape fruit trees —the great orchards with long, straight rows of round, symmetrical trees, their dark, glossy green alight with golden globes and waxy blossoms, often on the selfsame tree, and the single tree in a dooryard, so loaded with fruit that even the seemingly exaggerated picture postals are almost outdone.

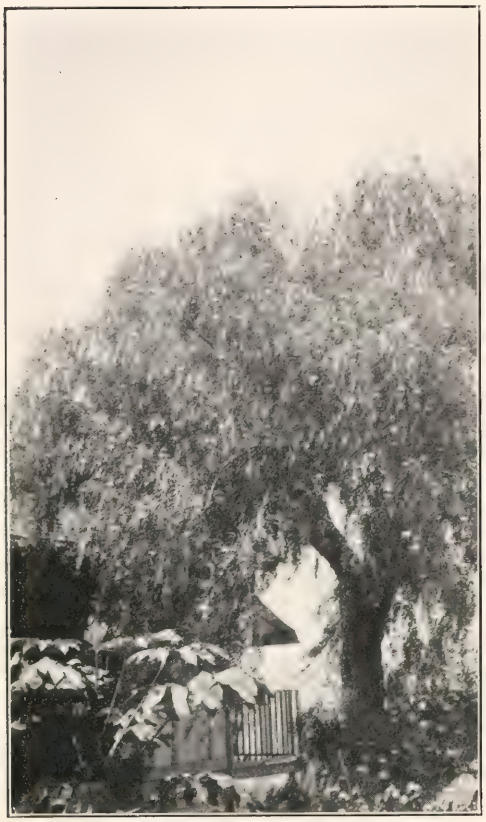
After the first enthusiasm over these brilliant color schemes, the traveller of artistic taste will have time to enjoy the softer coloring of the olive groves in the hollows of sunny hillsides, their finely cut, silver gray foliage (much handsomer than that of the European olive), gives a vivid meaning to the term "olive green." Electric greens and electric blues! A fresh idea of the meaning of these phrases is gained from the sight of an olive grove side by side with a patch of young blue gums, shimmering as with electric gleams in the sunlight, against the dusky green of the mountain background.

Blue gums are of the Eucalyptus tribe. A California tree article with the Eucalyptus left out would be like—no, we will not inflict the Hamlet comparison; but this tall, straight Australian, so conspicuous in every Southern Californian landscape, is too manifold in phases of interest for the limits of this article. We seem to hear faint echoes of the editorial cry, "Condense! Condense!" So the tree of the ragged bark may step into another article and give place to his rival in the interest of tourists, the pepper tree.



ROWS OF ORANGE TREES, OLIVE GROVES AND BLUE GUMS ON THE HILLSIDE.

This South American tree, so beautiful and graceful that many streets of the southern cities are chiefly adorned with her sweeping, finely cut foliage and red berries, preserves the vivid freshness of her green even in dusty summer time.



PEPPER TREE.
Aralia or Japanese paper tree in foreground.

A resinous gum which, perhaps, acts as an absorbent is the coat of mail for these "bouquets of ferns and red currants." But like many another beauty her chief asset must offset all others, for the wood of the pepper is brittle and useless and the foliage too thin to afford sufficient shade from summer sunshine. The leaves are subject to attacks of black scale and a sorry sight it is to see the rows of trees, which last winter excited so much admiration, in summer transformed to skeletons, cut back almost to the trunk, bare stumps of limbs with not a leaf left of the drooping foliage in growth so like the weeping willows that in walking the streets one must often duck to avoid their contact. Next winter these skeleton trees will be again clothed with green for, like all Westerners, Nature here does quick, energetic work.

Other trees much used for street ornamentation are the Grevillias and Acacias. The former are a disappointment for, although they put forth feathery foliage and grow rapidly at first, they become scraggly later and are only pretty when in blossom. The flowers at close view are very interesting—a mass of little yellow sticks with chocolate tips standing straight up from the horizontal stem; at a distance they give the effect of a mist of golden clouds amongst the green foliage.

There are over one hundred species of Acacia to be seen in the show places of Redlands, Riverside and Pasadena. The later winter months are glorified by their brilliant blossoms varying in shape from little gold buttons to drooping tassels and tall, feathery plumes of bright yellow.

Some trees are interesting for shape and mode of growth. The odd Auri-



AURICARIA—"MONKEY PUZZLER."



CEDAR OF LEBANON.

carias are most curious, especially the variety called monkey puzzler. This surely would puzzle any creature that tried to climb it for its long, twisted branches, covered by a spiral growth of spiky leaves, look like stiff green ropes surrounding the trunk in a labyrinthine twist. The umbrella tree supports its thick, even canopy of green with a circle of limbs radiating regularly from the trunk like the ribs of an umbrella. The Norfolk pine lifts its even circles of branches far skyward, making us smile as we remember the little specimens of this species, three feet or so in height, that we cherished in our eastern conservatories, counting with pride each fresh circle of green spikes on our little "Christmas tree."

The African silver tree is a rare species of great beauty. Its scale shaped leaves are silvery in color and clothe the tall trunk with a gleaming coat of mail.

A striking contrast to the foreigners around it stands the sturdy, old live oak, native son of the soil. When growing in the wild wood the oaks are picturesquely draped with gray moss but the few left within the city are huge, broad spreading, umbrageous trees adding greatly to the value of a lot so fortunate as to possess one.

The Monterey cypress uplifts its conical spire in charming contrast with the heavy, drooping branches of the ancient cedar of Lebanon, the glory of Carmelita. Another Biblical tree is the bay whose faint, spicy fragrance recalls June mornings spent in the green clad meadows on Cape Ann's rocky shores where wild rose and bayberry bushes vied with each other in pouring forth their incense. This Pasadena bay is no bush, however, but a broad spreading tree.

"You know," remarked the pious old gardener, " 'the wicked spreadeth himself like a green bay tree'."



BAY TREE.

When we first arrived in Pasadena we noticed a tall trunk the size of a young sapling, base somewhat ragged. No leaves but two or three feet at its top surrounded with little stems bearing what looked from below like upright clusters



CENTURY PLANTS TWELVE YEARS OLD

of dried dates. Could this be a date palm? Inquiry brought no information. Later, when we saw the tall flower stalk in its prime of blossom, surrounded by its basal crown of spiky leaves as tall as ourselves or taller—some of them six or seven feet, we knew that this was the far-famed century plant. Our first glimpse had been after the blossom had died and the leaves dropped off when the trunk is not good for timber or even firewood but, having a sponge-like heart, is cut off in sections and sold to tourists for century pincushions.

"When I lived in Iowy," said the same pious gardener, "I used to wish I could see one of them century plants in blossom, but I s'posed I never could without I lived to be a hundred. Now them plants there is twelve years old. They're about done flowerin' so the leaves fall off and they die. Ain't that the way with us? When our work's done the good Lord takes us home."

A WORD FOR WEEDS.

BY DR. W. WHITMAN BAILEY, BROWN UNIVERSITY, PROVIDENCE, R. I.

It has ever been a vexed question how to define a weed. Best friends have quarreled over it. It is like the mistress among admiring lovers. Each adores her equally, but because neither can perfectly describe her charms in the terms of the other, they resort in their disagreement to personal abuse. Arbitration can no more settle the dispute than it can many disputes that arise among the nations—and which the dreamer ignores. Lexicons disagree; the persons most familiar with cognate facts find themselves at variance.

Let us consider some of the variations and accepted definitions. A weed is a herbaceous plant growing out of place. This at once implies that if it were in place its weedy character would be lost. Such, in fact, is the case. Take the "white-weed daisy" or "ox-eye" and cultivate it as a garden flower or pluck it in the fields even for a bouquet and it is beautiful. Out of place; viz., in grass fields or meadows, it is, from its abundance and aggressiveness, a weed—one of the very worst prevailing over some parts of the Union. It is only excelled, if indeed surpassed at all, by the omnipresent wild carrot which is not always useless, is perennially beautiful, yet undeniably a weed. *Rudbeckia,* "black-eyed Susan" or cone-flower again is a weed when it intrudes by the thousand on a meadow or hayfield, but a joy for Persephone when it clothes a whole landscape with richest gold.

Some weeds are well limited by the dictionary definition, "useless plants," yet we can all think of examples styled weeds that are not strictly useless. We may, if heroic and so minded, forswear

the weed of all, tobacco. Says Calverley in "Fly Leaves:"

"Cats may have had their goose
Cooked by tobacco juice,
Yet, why desire its use—
Thoughtfully taken?"

Whether or not we consider it harmful, from the view of economics we must realize its utility and, if we see a field of it in bloom, all its trumpets blowing, concede its beauty. With the exception of Indian corn and cotton, there surely can be no handsomer crop.

Consulting another dictionary, quite at random, we find "a weed is a troublesome plant." So is a potato, if we enter upon a campaign against the ten lived Colorado beetle. So is a raspberry, if we get into a tangle of its prickly shoots; or the mountain laurel, if we attempt to penetrate a copse of its elastic boughs. Thistles are, to be sure, "troublesome," but how gorgeous, on the other hand, they may become! Does the lamentable fact that opium is abused make a weed out of a poppy? If one ranks its exquisite blossoms among weeds, why not at once enter in the same list, lilies, irises and arethusa?

Despite the various and incongruous views of what constitutes a weed, most people have a good working idea of one at its best—or worst. No one ever hesitates to classify a pigweed, the "Jimson weed" or "thorn-apple," the Amaranthus, most knotweeds, purslane, carpetweed, beggar-ticks, cocklebur and burdock as weeds. Only one of them, the thorn-apple, has any conspicuous beauty; but this, though full of rare grace, is, after all, coarse, ill smelling,—not of the aristocracy of plants. Yet how very near does it approach to even regal honor; its cousin, *Datura metelloides* of the far West is one of the grandest and most fragrant of flowers.

The vast majority of weeds in this country are of European origin. They arrived years ago with our ancestors and still are coming with later Jews, Gentiles and dwellers in Mesopotamia. In some cases, no doubt, were they brought with deliberation, as flowers, the immigrants feeling a prescience that all here would be new and therefore insistent for home faces. Thus, the little daisy-like Mayweed may have come. Others, possibly, like tansy and cypress spurge, were deemed medicinal and were introduced for domestic purposes—or the home pharmacopoeia. Many arrived with more valuable seeds or adherent to clothing, merchandise or ballast.

Every botanist knows what fun it is to collect on a ballast heap. Such a place is equal with an enthusiast to a visit to Kew or the New York or St. Louis botanic gardens. He is quite sure to find some stranger, some waif, from far off, foreign countries or distant parts of our own.

The question of how these plants suddenly appear and whence they come is one of the most interesting of the by-problems of botany. The least careful observer, the child even, knows that many plants are provided with special apparatus for their distribution. Burdock and cocklebur, worthless weeds both, so far as we yet know, are bristling with hooks or grapnels that lay hold of the fleece or fur of animals, upon articles of commerce or even upon the apparel of man.

Beggar-ticks make use of their retrorse barbs, acting in the manner of fishhooks, easily penetrating any fabric, but caught more firmly by any effort to remove them. A vast number of weeds resort to aerial navigation, a problem they have perfectly solved. Look at the parachutes of milkweed, the "clock" of dandelion or the down of thistle and hawkweed. Three or more species of the latter, unknown in our country thirty years ago, are now spreading over New England and the Middle States. They come from Europe, and no Custom House turns them back. One, from the intense color and beauty of its flowers, formerly called Venus's paint brush, is now referred to the devil for the same artistic uses. Another, of later arrival, assumes the name of the old boy himself and is called "viny devil."

Other plants, but these are mainly trees and shrubs, are borne by variously contrived wings, as maple, ash, ailanthus and linden. "Tumble-weeds" are such as at full fruition roll up, disengage from

the soil and are borne by the wind over the fields until a knoll, rock or some other impediment causes their arrest. The worst one of these, and it has appeared but recently in the east though extremely common in the west, is the so-called Russian thistle, nearly allied to the perfectly harmless salt-weed that grows along our seashore.

Given these natural means of distribution, and there are many more contrivances, it still remains a problem how



ONLY A WEED—MILKWEED.

some of these European weeds suddenly appear. The degree of permanency of some of these foreigners offers an interesting study. Not being attended by their natural enemies, those that attack them in their home lands, and reaching new and favorable soil, they often increase and multiply to an astonishing extent, holding their own and driving out the natives. Some cases are cited from Maine where the orange hawkweed has even made incursions into the forests, driving out the wild flowers.

Not many years ago the prickly lettuce made its first appearance about Providence. It now covers waste places all about that city and suburban villages. In a trip made to Chicago in 1900 it was never out of sight from the car windows. Now it is said, and this too is curious, it has reached its acme and is slowly decreasing.

Railway yards and ballast heaps are always places of pious pilgrimage to the plant lover. There he is sure to pick up some rare or curious immigrant. State and national governments must keep vigilant watch for these intruders.



THE HEAVENS IN OCTOBER.

BY GARRETT P. SERVISS, BROOKLYN, N. Y.

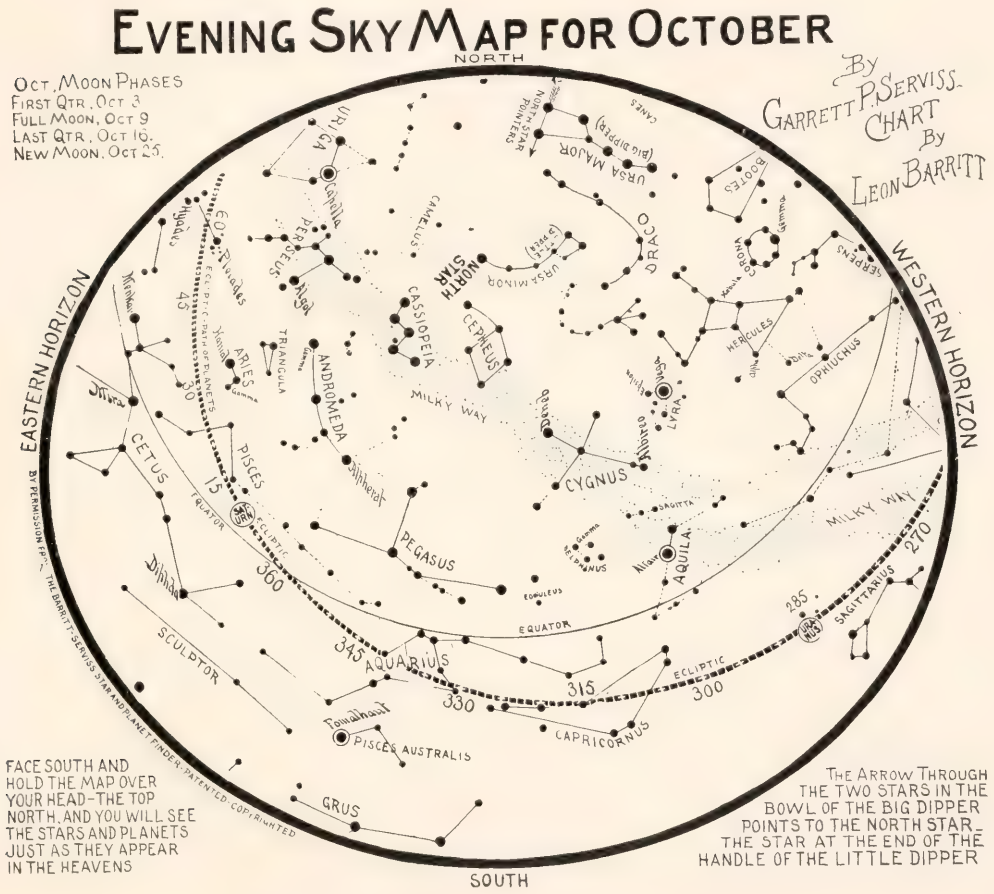
With the exception of Mercury, which sets very early—too early for the hours represented in the diagram—the only conspicuous planet adorning the evening sky this month is Saturn, situated in the constellation Pisces, Saturn is well up in the east at 9 o'clock on the 1st of October and at 7 o'clock on the 3rd. It lies southeast of the Great Square of Pegasus and very close to the equator. It is readily distinguishable from the stars on account of its placid unscintillant light. The rings are now sufficiently open to present a very attractive spectacle with a telescope, the earth being situated about six degrees and the sun about six and a half degrees south of the plane of the rings. It is, accordingly, their south surface that we see. They were a little more widely opened in August, and they will grow gradually narrower until the middle of December. On October 1st the minor axis of the rings will be about one-ninth as great as the major axis—in other words the apparent length of the rings, projecting out east and west on each side of the globe of the planet, will be nine times as great as their greatest apparent breadth north and south. In fact the rings are circles, but being situated in the plane of Saturn's equator, which is not far from coincidence with the plane of the earth's equator, they present themselves always more or less edgewise to the line of sight, and consequently are seen in the form of long ellipses. Recent studies of these rings have thrown some light upon their probable constitution. It has long been known that they are not solid bodies, but, instead, are composed of innumerable particles revolving independently, yet almost in contact with one another, around the planet, like flocks of minute moons. Certain phenomena which they have presented when seen exactly edgewise have led to the conclusion that they are subject to the action of tidal forces which may eventually dissipate them, sending some down upon the planet and others out beyond their present limits where they may be aggregated into larger bodies, thus forming true satellites or moons. The present known number of Saturn's moons, all situated beyond the outer border of the rings, is ten. Of these four or five can easily be seen with telescopes, and one of them, named Ti-

tan, has a diameter considerably exceeding that of the planet Mercury. Another, Japetus, is of about the same size as our moon. The extreme diameter of the rings of Saturn is 168,000 miles, but their thickness does not exceed 100 miles. The mean diameter of the ball of the planet is 73,000 miles, about 13,500 miles less than that of Jupiter, but more than nine times greater than that of the earth. It is a curious fact that owing to its slight density which is less than that of water, the force of gravitation upon the surface of Saturn is not very greatly in excess of that upon the earth. Accordingly if we could stand upon Saturn we should not be crushed down by the weight of our own bodies, as we would be upon Jupiter. The slightest mean density of Saturn has led to the conclusion that most of its mass is probably yet in a gaseous state, and it may even give out a slight luminosity of its own.

Mercury has already been mentioned as an evening star setting very early, at about the same time that Saturn rises. It attains its greatest eastern elongation from the sun on October 4th. Uranus is also an evening star in the constellation Sagittarius, setting about 10 P. M. in the middle of the month. The other planets are all morning stars. Venus at the beginning of October is close by the Sickle of Leo on the west, but by the end of the month she will have passed in Virgo, being in conjunction with Jupiter on the night of the 11th. Jupiter remains in Leo. Mars is in Virgo, moving eastward, and will be overtaken by Venus at the end of November. Neptune, very slow in his movements, is in Gemini, and is only visible in the most powerful telescope.

The stellar gem of October is the brilliant Vega in the constellation of Lyra, which may be seen slowly dropping down the northwestern quarter of the sky, preceded by Hercules and the Northern Crown, and followed by the Northern Cross in Cygnus. South of the Northern Cross, and like it immersed in the Milky Way, glitters Altair in the constellation Aquila. The Great Bear, with the Great Dipper, is under the pole in the north, and Cassiopeia is high in the east, southeast of Polaris. Below Cassiopeia, toward the south Andromeda lies extended, her head touching the northeast corner of the Great Square of Pegasus. East of Andromeda, following her along the path of the Milky Way, appears Perseus, brandishing his diamond-hilted sword, and carrying the Head of Medusa, with the strange winking star Algol in his left hand. Near the ecliptic, below Perseus, glitter the Pleiades, just risen, and north of the Pleiades shines Capella, a starry jewel capable of rivalling Vega itself, but not possessing the blue-white brilliance of the latter. In the east Cetus is seen rising, and, between Cetus and Andromeda appears Aries, the Ram, the first constellation of the zodiac. Low in the south, east of the meridian, glows the lone star Fomalhaut in the Southern Fish. The Milky Way, now arching across the sky from the northeast to the western horizon, is always an object of great beauty, in the absence of moonlight. It cannot, however, be well seen in cities. Those who have never seen the Milky Way on a clear dark night in the country can have no conception of its sublime beauty, and of the thoughts of immensity which it awakens. It is very brilliant in Aquila, Cygnus, Cassiopeia and Perseus. Above the head of the Northern Cross the eye readily observes a dark space in it recalling, to some degree, the appearance of the celebrated "Coal Sacks" in the Southern Hemisphere. All along its course the Milky Way, composed of millions of stars, too small or too remote to be individually evident to the naked eye, throws itself into vast loops, garlands and clouts, which, in their ensemble, produce a most majestic effect. A good opera-glass reveals many fields of stars in the Milky Way of astonishing beauty. In the mythologies of many nations the Milky Way has been regarded sometimes as a mysterious pathway among the stars trodden by gods and spirits, and sometimes as a veritable river in the heavens, a river composed of some ethereal fluid as evanescent as vapor. But in the eyes of the astronomer the Milky Way is the framework of the universe, and all modern investigations of the constitution of the

celestial system are based upon it. Our sun, which is but a pygmy in comparison with the greater ones surrounding it seems to be situated not far from the center of the vast space which the Milky Way encircles like a starry girdle. But the sun is in motion across this comparatively open space, travelling at the greatest of these, one within the reach of the most modest instrument, is the charming Albireo, or Beta Cygni in the foot of the Northern Cross. The larger star is yellowish white and the smaller deep blue, and their distance apart is about half a minute of arc, or say one-sixtieth of the diameter of the full moon.



rate of about 12 miles per second from the south toward the north, and dragging the earth and the other planets with it. It is like an illuminated mote drifting across an immense apartment which is encircled with countless lamps. Whether it will go on as it is now going, or will turn again, is something that lies beyond the present range of our knowledge. For the benefit of those possessing telescopes attention may be called to a few of the conspicuously beautiful double stars now to be seen. One of the I have separated this star with a powerful field-glass. Another beauty is the star Gamma in Andromeda, the last conspicuous star toward the northeast in the row marking that constellation. Here again there is a beautiful contrast of colors between the component stars. But they are much nearer together than those in Albireo. Gamma, the smallest of the three stars in Aries, shown in our chart, is a beautiful double, interesting as being the first double star ever discovered. Its duplicity was discovered accidently by

Robert Hooke in 1664 while he was following a comet with his telescope. Now thousands of double stars are known. The "double-double" star Epsilor in Lyra the northernmost of the two little stars making a triangle with Vega, is always an interesting object to view with a telescope capable of magnifying 150 diameters. The star Gamma in Delphinus, a Job's Coffin, which will be seen below Cygnus and east of Aquila, is also a beautiful double. Gamma is the easternmost of the four stars of Delphinus shown on the chart.

There are many meteor showers visible in October. Mr. Denning has identified no less than nine. One of them, occurring on the nights of the 18th to the 20th inclusive, is usually quite bright, the meteors moving swiftly and leaving streaks behind them. They radiate from a point in the feet of Gemini, the twins, and the radiant focus is well up in the east before midnight. When several meteors are seen in succession an effort should be made to trace their paths backward to a point of intersection. In this way the "shower" to which they belong may be determined. The study of meteors is one of the branches of observational astronomy which requires the use of no instruments except a pair of quick true eyes.



DOUBLE PHOTOGRAPHS WANTED.

THE GUIDE TO NATURE desires skill in the use of the camera in all lines. To that end, a year's subscription is offered for the best double photograph received before December 1st.



AN INTERESTING EXAMPLE OF A DOUBLE PHOTOGRAPH.

THE KODAK IN NATURE.

BY GEO. W. KELLOGG, 42 BUENA PLACE, ROCHESTER, N. Y.

A fifty cent portrait attachment will add dollars in value to your kodak, and both combined will furnish you an outfit, which, for general nature photography is second, only, to the long draw, expensive equipment. The portrait attachment, fitted like a cap over the regular lens, so shortens the focus of the combination, that it is possible, without extra extension of the bellows, to photograph objects at very short range and to get fair sized images, direct, of very small objects. The portrait attachment can be attached and detached at will, and the use of it will not interfere with the working of the kodak in the ordinary way.

During a period of four and a half years, the kodak, with and without the



CATERPILLAR OF THE REGAL MOTH.
Citherona regalis.
Negative with Kodak and Portrait Attachment. Stop 8, U. S. (f/11.3). Instantaneous exposure.



BARK OF THE TULIP TREE.
Kodak negative.



YOUNG THRUSHES.
Negative made in an ordinary room with Kodak and portrait attachment. Stop 4, U. S. (f-8). Shortest possible bulb exposure. Distance from subject, 28 inches.

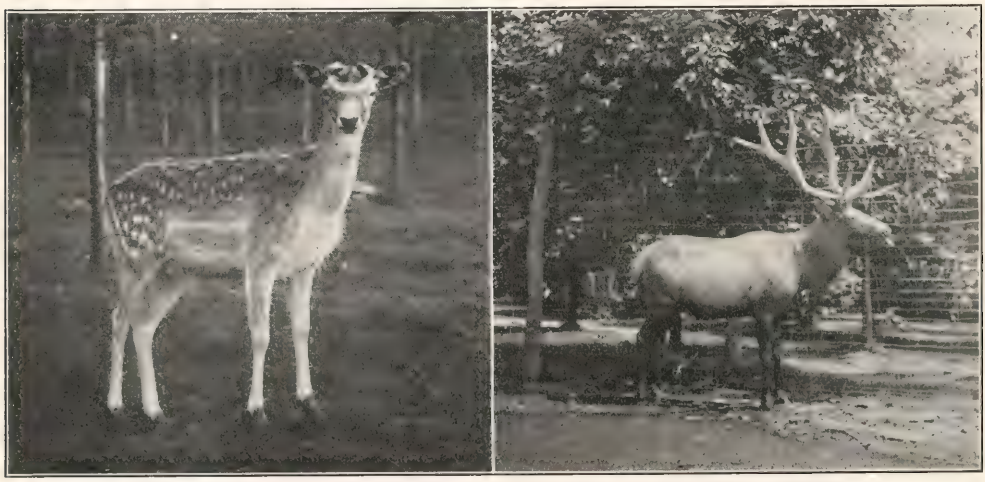
KINGBIRDS IN NEST.



A GOOD REFLECTION WITH KODAK.

portrait attachment, has been used on a variety of subjects, including flowers, plants, native trees, fungi, caterpillars, birds and their nests, animals; and there is not an instance, in which a failure was due to the inefficiency of the instrument. Focussing was with the scale, always; distances being estimated in the ordinary work, and accurately measured from the front lens to the subject when the portrait attachment was used. With this combination of lenses the wide open diaphragm and the making of snap-shots except in cases of absolute necessity, have been avoided. Not that the combination is incapable of the work, but, owing to the general lack of that sufficient depth, which, working at close range, can be secured, only, by stopping down; which, however, does not imply that very small stops must be used. By usage stop 32 U. S. (f 22, 6) became a standard, those on either side of it being drawn upon as occasion required; but seldom a larger or a smaller one.

The illustrations of the Citheronia (caterpillar of the regal moth), kingbirds on the nest and young thrushes, are some of the exceptions. The first was a snap-shot, necessitated by the continual movement of the subject; the stop indicator pointing to the mark 8 (f 11.3). The others were photographed in an ordinary room, with a sheet of cardboard for a background, the stop indicator at the mark, 4 (f 8), and with the shortest possible bulb exposure. The other illustrations were photographed in the ordinary way.



"SOME "SNAP SHOTS" IN THE PARK.

PHOTOGRAPH OF FEEDING GULLS.

BY F. C. WALCOTT, NEW YORK CITY.

The gull picture is one of a large flock of "herring gull." The land in the background is Mount Desert. The picture was taken just out of Bar Harbor, and while these gulls in large numbers often follow a school of herring that have been driven to the surface by larger fish, the herring were not the attraction in this case. It was the garbage thrown out upon the water from the garbage boat that daily puts out to sea from Bar Harbor. This photograph was taken from a dory as the garbage floated out on the tide.



PHOTOGRAPH OF FEEDING GULLS.
Off coast of Mount Desert.

These gulls breed in large numbers about fifteen miles from Mount Desert, on a deserted island called "Duck Island."



A STUDY OF EARLY FROST IN THE LOWLANDS.
Photograph by George W. Kellogg.

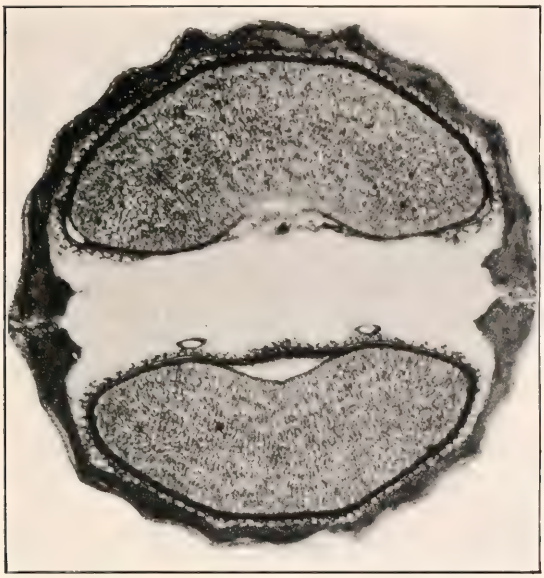
SEEING BY AID OF THE LENS

EXAMINING THE STRUCTURE OF SEEDS.

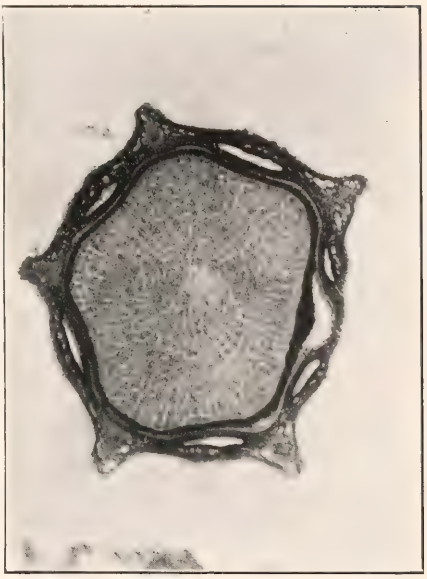
The peculiar objects shown in photograph are slices, or what the microscopist calls sections, of grains of Indian corn cut across from the front edge toward the point of attachment to the cob. The bulk of nearly every seed is formed of what the botanist has named the albumen, and is there preserved for the nourishment of the sprouting plant, which absorbs it, after the moisture of the earth and the warmth of the sunlight have brought about important chemical changes in its composition. But as man has discovered that the albumen of many seeds is good for his own nourishment, he grinds the grains of wheat and of other cereals, to flour, which is therefore composed chiefly of this starchy albumen. The grains of Indian corn are no exception in the abundance of this material, as the sections here shown will readily prove, all the light-colored por-



NO. 1 CROSS SECTIONS OF GRAINS OF INDIAN CORN.



NO. 2. SECTION OF CORIANDER.



NO. 3. SECTION OF SEED OF CELERY.

tion at the upper left-hand region being composed of the albumen. The slices, each of which has been cut from a slightly different level, also exhibit sections of the most important part of the seed, the germ, or embryo that, in favorable conditions, will grow into a plant similar to the one that produced the seed.

The photograph shows that the embryo of the Indian corn is placed at the side of the albumen, the lower, darker parts on the right-hand side being a section of the germ ,with its single cotyledon, or the part that will develop into the single seed-leaf, which, in the illustration, is shown folded, as it naturally is folded, around the narrower, central portion, the plumule, or the first shoot of the sprouting plant. In the Indian corn only one leaf appears from each seed, while in many others there are two.

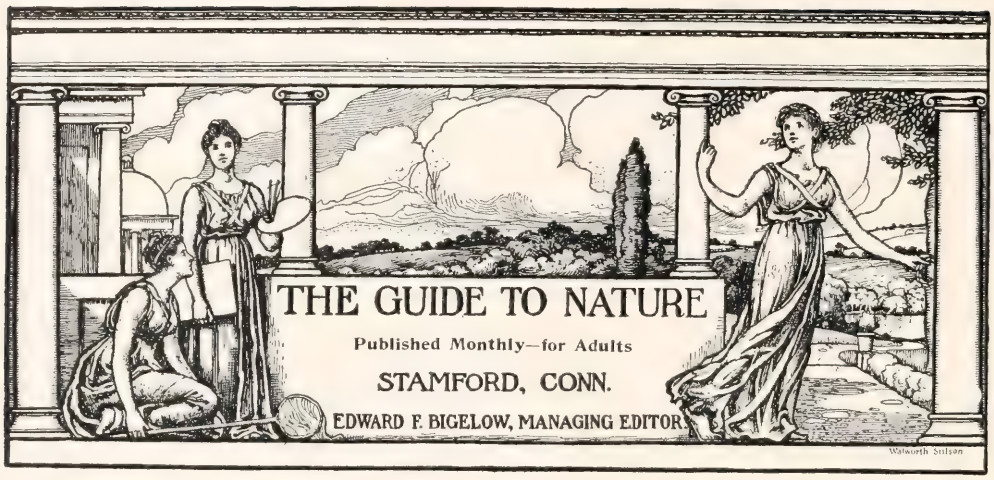
In the illustration the single seed-leaf is seen forming an irregular, inverted U-shaped surface, beginning at the upper right-hand part, continuing around the upper portion, and extending downwards almost to its point of origin. It has this U-shaped aspect because the knife has cut across the folded cotyledon. A similar appearance may be obtained by slicing almost any thick leaf, after it has been doubled together in a fold parallel with its foot-stalk or stem.

The elongated darker portion is the plumule, which will shoot up and bear the first leaves.

The part from which the roots grow is the radicle.

Photograph 2 is a transverse section of the spherical fruit of the aromatic coriander, so often cultivated for its spicy qualities. The oily substance which gives the fruit its aromatic properties, is contained in little longitudinal tubes, called vittæ, and placed in the body of the fruit. If a recently-made section be held against the light, they will become easily apparent, especially if examined with a low-power pocket lens, and will seem to be minute, circular, light-colored spots or rings, as any other tube would seem to be if cut across and looked at from above. In the picture of the coriander section they are not clearly shown, probably because the slice is thicker than it should be. The embryo is very small, and is not visible in the photograph, the razor having passed through the hard albumen above it.

Photograph 3 is a similar section through the seed-vessel and the seed itself of the common celery, a plant belonging to the same natural order (the Umbelliferæ) with the coriander. The entire central portion is filled with the albumen.



ACTIVITY VERSUS LISTLESSNESS.

Life is real (sometimes)! Life is (or should be) earnest!

But whatever we are, although we are lacking in many respects, the surroundings are right. For the artistic and the studious spirit there is plenty of objectivity—always plenty to do, to see or to know. "Here," said Linnaeus to a pupil, placing his hand on a bit of moss, "is sufficient material for the study of a lifetime." Do not stand still within doors, holding in motionless hand your palette and brush; do not keep in dormancy within your heart that appreciation of beauty which every human being possesses in greater or lesser degree. Let love kindle that listless appreciation into activity. Go forth into the realms of beauty. Put yourself in touch with an occupation which an eternity is not long enough to exhaust.

Get up, you student. Take your net, your collecting apparatus, your scapel and your books and use them in nature. Flee from the trite and the conventional. Get into new fields. There is nothing you have "completed." In everything you are only a beginner. You have not grown old in nature knowledge. You are only a child in the primary. Push on and make yourself fitted to enter a higher grade.

Let the spirit of THE GUIDE TO NATURE lead you forth into the enchanting realms. They are over the hill "just a little out of town." There dwell riches free to all, the health of nature's sanatorium, the education that surpasses that of the schools and, best of all, there is the religion of the Infinite.

NATURALISTS, NOT ORNITHOLOGISTS.

Since the first announcement of THE GUIDE TO NATURE, we have had submitted an unduly large proportion of articles on birds. We have published only a few, because there is no desire to make this an ornithological magazine. That field is already well cared for by "Bird-Lore" and others. THE GUIDE TO NATURE is not to compete but to supplement and to co-operate along general naturalists' lines. Interesting as are birds, important as it is to protect them, they are not the whole of nature. "Everything is "fish' that comes to the net of a naturalist." THE GUIDE TO NATURE is the naturalists' net, to draw in and to make available to all the observational "catches" of all.

"Bird-Lore" is an efficient magazine—ideally edited, illustrated and printed. We cordially commend it and the science it represents to all our readers. Love, knowledge and sympathy with birds are valuable attainments, but an attunement in the interests of all nature is greater.

Most bird students, even the specialists, have a cordial sympathy and lesser interest in all nature. Most general naturalists recognize the many claims of birds to our attention. For these reasons THE GUIDE TO NATURE is co-operating with "Bird-Lore" and The Agassiz Asso-

ciation with The Audubon Society in an attempt to stimulate both general and special interests.

SUBMERGED SEEDS.

On the mud bottom, after the drainage of a pond in Cold Spring Harbor, L. I., there grew 140 species of plants. This suggested the question, did the seeds drift in that spring, or was the growth the results of seeds that had been assembling for many years. In other words, how long can seeds of common wild plants retain their vitality in mud and water?

To ascertain this, experiments are in progress by keeping a series of jars of mud and water, and opening them at long intervals. One that has been kept twenty-nine months has a luxuriant growth. Another will be opened in fifty-three months and the last of the series will be kept ten or fifteen years.

This is an interesting experiment that can easily be performed by any one at little actual time employed. Just collect the mud from ponds, put in bottles or jars, open at regular intervals, watch and wait.

Then report results.

STUDYING THE EGGS OF A CECROPIA MOTH.

Near my laboratory is a luxuriant growth of honeysuckle, that at the time I have in mind was in full bloom. Some visitors had been around the laboratory in the early evening. As they were passing down the walk toward the road, one of them exclaimed, "Oh, look at those lady birds." I must confess that I had at that time never heard the term lady bird applied to a moth. My first impression was that it was a new name for some of our well-known birds, and so I at once looked at the tree tops. The visitor exclaimed, "No not there, but on your honeysuckle bush," and there I saw not birds, but cecropia moths, self-evidently the male and the female. I placed them within a cage and therein was laid a mass of eggs about ⅛-inch in height, covering the space about as large as that of a cent.

I kept this mass, saw the little black larvæ hatch out and gradually turn to a greenish color as they grew older. Herewith is a photo-macrograph of the egg mass, but this only faintly represents the beauty of the eggs as I saw



EGGS OF CECROPIA MOTH.

I found it convenient to put some mucilage on a strip of black cardboard and place on this the egg mass. Then it was convenient to handle and the eggs were brought into clear view by the black background. The eggs hatched as will be seen in the illustration.

them by the aid of a hand lens and also projected on the ground glass of the camera. I cordially commend the study of eggs of insects to our readers



THE PAIR OF CECROPIA MOTHS ON THE HONEYSUCKLE.

and hope that THE GUIDE TO NATURE may have many articles along that line from our contributors.

BLOWING UP A MOUNTAIN.

"What are you going to do with that mountain?" I asked.

"Blow it up," he replied, as though a well-developed mountain was of no more importance than a pebble in his path.

That graphically tells the story of just how the new transcontinental is being built. And the blowing up of "mountains" in these days of powder and dynamite is not a myth. In the mountain and wilderness regions "coyote holes" are being fired every day, and one can sometimes hear the explosion thirty miles away. I was present at one of these events. Four thousand yards of rock stood in the path of the transcontinental. A curve would have taken one round the base of it. But "orders are orders," and the "coyote" was dug. A soft seam was found in the mountain of rock, and the tedious task of drilling into its heart was begun. When completed the "coyote" was a tunnel about four feet square running back into the rock for fifty feet, where it terminated in a chamber. It took half a hundred men to carry in the explosives. One hundred and twenty-five barrels of powder were dumped into stacks and the sacks packed in the chamber, and with these were three cases of dynamite of fifty pounds each. Electric wires and fuses were then connected with the mine, and after that the face of the tunnel was rammed solid with rock and earth. When the time came for the terrific explosion there was not a soul within half a mile of the mountain.

And then a lightning flash passed along the wire. One minute—two—three—five passed, while in the bowels of the mountain the fuse was sizzling to its end. Then there came a puff, something like a cloud of dust rising skyward, but without sound; and, before its upward belching had ceased a tongue of flame spurted out of its crest—and after that, perhaps two seconds later, there came the explosion. There was a rumbling and a jarring, as if the earth were convulsed under our feet; volumes of dense black smoke shot upward, shutting the mountain in an impenetrable pall of gloom; and in an instant these rolling, twisting volumes of black became lurid, and then it was as if all the guns of all the navies of the world had exploded close to our ears. As fast as the eye could follow a sheet of flame shot out of the sea of smoke; climbed higher and higher, in lightning flashes, until the lurid tongues licked the air a quarter of a mile above the startled wilderness. Explosion followed explosion, some of them coming in hollow, reverberating booms, others sounding as if in mid-air. The heavens were filled with hurtling rocks; solid masses of granite ten feet square were thrown a hundred feet away; rocks weighing a ton were hurled still farther

as if they were no more than stones flung by the hand of a giant; chunks that would have crashed from roof to basement of a sky-scraper dropped a third and nearly a half a mile away. For three minutes the frightful convulsion continued. Then the lurid lights died out of the pall of smoke, and the pall itself began to settle. And when it was all over the granite monster that had stood there for unnumbered centuries had, as the engineer rather poetically expressed it, "made way for the new transcontinental."—James Oliver Curwood in *Putnam's and The Reader* for October.

CORRESPONDENCE AND INFORMATION

CACKLING OF HENS.

Terre Haute, Indiana.

To the Editor:

Has any satisfactory reason been given for the cackling of hens after laying?

Very truly,

Walter H. Woodrow,

Department of Science, Indiana State Normal School.

The cackle of the hen may serve two purposes: (1) to notify the cock that she is ready to have his company, and (2) to divert attention from her nest by attracting it to herself.

The cock keeps at a good distance away while the hen is on the nest, and the cackle would serve to bring the two together. The behavior of the jungle fowl suggests this view.—C. O. Whitman.

INDIVIDUALITY AMONG SPARROWS.

Belfast, Me.

To the Editor:

An incident showing the difference in intelligence among individuals of the same species of birds came under my notice a short time ago. I was feeding, with cracker crumbs, a number of chipping sparrows, *Spizella socialis*. Among the crumbs were a few scales a half inch or less in diameter. One of the birds seized one of these scales by the edge, and after trying in vain to break it by vigorous shaking, threw it down and flew away in disgust. Another bird hopped along to the rejected morsel, and after eyeing it a few seconds, gave it a sharp blow in the center with his bill, breaking it into small fragments. He then ate it at his leisure.

John S. Fernald.

CAN IT BE THE CROWS?

To the Editor:

Our friend, the crow, may be very black, but he is not, in one sense, as black as he is painted. He does his own share in destroying the enemies of the farmer —those otherwise unfindable creatures who contrive to curtail the corn-crops, even in the best regulated of fields.

But to-day the question the writer would ask concerns potatoes rather than corn. There is no corn, or other vegetable, planted anywhere near the potato-field, which at the usual period of molestation was attacked by the industrious potato bug.

There is nothing in or about the field or its locality which would seem to invite the interest of the crows, yet every morning, between four and five o'clock, for some time, our neighboring colony of crows, numbering twenty or more, may be seen walking up and down the potato rows, evidently bent upon some absorbing errand which calls them there each morning with the rise of the sun.

The question, what has become of the potato-bugs? suggests another: can it be the crows to whom thanks are due for the green, undamaged potato vines growing luxuriantly though unprotected through human agency?

We are disposed to add a new feather —a very white one—as a possession of our friend the crow, and are wondering if anywhere else he has been observed under conditions calculated to attribute to him equally important service of like character.

GEORGE KLINGLE.

INTERESTING PHOTOGRAPH OF MOTHS.

141 Milk Street,
Boston, Massachusetts.

TO THE EDITOR:

Enclosed find photograph of telegraph post at corner of Broadway and Westminster Street, West Somerville, Massachusetts, with its swarm of brown-tail moths, as it appeared on the morning of July 1st.



THE GYPSY MOTHS ON A POST.

There were myriads the evening before about the electric lamps, which appeared as if they were in the midst of a heavy snow-storm. All the surrounding towns were visited and they were to be found even in Boston itself.

I understand that Mr. Forbush, in charge of the gypsy and brown tail moth work in this State, pronounced them mostly males, so perhaps no great harm will result, and a great many of them were destroyed.

Yours truly,

H. E. VALENTINE.

APPRECIATION AND SUGGESTIONS.

Cincinnati, O.

TO THE EDITOR:

The September number of THE GUIDE TO NATURE has appeared. As you so truly say, it is larger and better than any that has preceded it. I must reiterate that THE GUIDE fills a long-felt want. It tells us things or rather facts, which one can not glean from any other source; no text book gives them; no other journal mentions them. And so it behooves us not to criticize THE GUIDE, but to praise it; and this we do unstintedly.

We, who are interested in Nature know the woeful lack of knowledge extant on this, our favorite topic. Why is this? Is the environment at fault? No. The trouble lies in our schools and educational institutions. It is true that nature study is being introduced in different cities; but the old-time teachers are not prepared to teach it. They themselves had been so thoroughly drilled in the three R's, that their knowledge, as a rule, does not extend much beyond this. And as to teaching a topic so new, so complex, and so "utterly absurd" as nature study, the result can be clearly foreseen.

Here, it seems to me, your valuable GUIDE might be of inestimable service, if you were to introduce a department of teaching nature study, or "How to teach Nature Study."

I have spoken to many teachers, and they seem so helpless in trying to teach this topic. So few have even the first conception of animate and inanimate things about them. Their lack of knowledge concerning the flowers, the grass, the trees, the worms, the butterflies, is pitiful. What a pity that the old idea is still so firmly rooted in the minds of most educators that there is but one subject which will develop the mind, viz., mathematics.

What a fallacy this is; how many hours of toil and heart-ache are occasioned by this hackneyed old monstrosity.

Take the classes afield, lead them along the winding brook, take them out under the azure heavens and teach them the wonderful stories about the stars. Teach them to love the birds, the flowers, the trees, the rocks, and without any effort they unconsciously develop a greater love for man himself. School days should be made pleasant, not irksome. What a wonderful country this would be if a book such as Prof. Clifton F. Hodge's "Nature Study and Life" were adopted as a standard text book for all the schools, aided by a journal such as your GUIDE TO NATURE.

The work done now by the forestry associations in saving forests, that of the Audubon societies in preserving birds, and that of the Humane societies to protect the weak and the helpless, would all be unnecessary; and the millions of dollars spent in saving and preserving could be turned into other channels, particularly educational.

May your valuable journal be a great factor in disseminating knowledge of things about us, and may it grow enormously, and with the wish that it become a regular visitor at each and every school in this vast country, I beg to remain,

Yours very sincerely,

G. A. HINNEN.

HOW TO TEACH ONE'S SELF BOTANY

TO THE EDITOR:

What professor Bessey says, in the September number, about the cultivation of one's power to observe is timely and correct. What he says in regard to learning the names of things is equally true and valuable. The desire to know the name of any object that interests or even momentarily attracts the attention, is a natural quality of the human mind, and that name may, in a botanical way, lead to other and perhaps to better things. It may recall, even to the amateur, self-instructed botanist, the natural order to which the specimen belongs; it may tell him somewhat of the structure of the flower; somewhat of the peculiarities of the seeds; the plant's special habitat; the character of the soil that it most affects; and it may finally lead his thoughts to the ends of the earth or further. In an active mind, one thought or suggestion generally leads to another cognate notion, this to something else perhaps only remotely connected, until at last the observer, with only the name of his plant, may, by "the association of ideas" find himself in imagination exploring the plains of Tartary, or the hollows of Death Valley. By all means get the name, and do it first, and do it yourself. The isolated young student, to whom Professor Bessey refers as needing help from a professional botanist, really needs no such aid. He may help himself, and he will, if he be wise, and he will be still wiser if he will always rely on only his own efforts. Then when he goes astray botanically, he will retrace his footsteps, observe where he left the trail, mend his ways and do better the next time.

Botany is so interesting, it is so helpful, so restful to the jaded man, who may have an hour's leisure to pass in country places or in the suburbs, that, if I could, I would make the study a requisite in every class in every public school in the land, from the Kindergarten to the highest grade in the High School and the Academy. The objects for examination and for suggestive thought are so abundant, so common in every field, in every fence corner, on every garbage dump, that to suffer a lack of specimens is impossible. But, unless the mentality of the pupil is greater than his physicalness, such efforts would be in vain; and no human being, unless his mentality is naturally somewhat developed, will even dream of teaching himself botany, or anything else. He will not willingly remove his mind from the continuous struggle for existence.

With only a passing reference to floral beauty; to the possible strange-

ness of structure and parts; to regularity of form or to its apparent whimsicalities; to the shape and the surface aspect of leaves; to the laughable resemblance, it may be, of seed vessels to some familiar domestic utensil or object, like those of the common wild cucumber, which, when once seen can never be thought of without a smile, nor without a feeling of astonishment at such a freak of nature; all these and more are waiting.

No season limits the botanical student. Professor Bessey's correspondent began his investigations in a Nebraska winter, when blizzards are ever ready to jump up and do things. He was successful, too, but for only one reason. He wanted to know. With that want unsupplied, a student is successful from the start. Enthusiasm and a little mentality are pre-requisites.

But Professor Bessey is not quite explicit enough, I think, to be entirely helpful to the beginner that desires to begin, and is alone. What little botany I know, and I confess that while it is not much, I should not be willing to part with it for much money, but that modicum I have taught myself by the use of a single book; the best book on the subject ever written for the teacher of self, although to the advanced or to the professional botanist, it is, I have been told, open to criticism, because it is not strictly "scientific." Strictly scientific or not, it is, I repeat, the best book ever written for the purpose now in view. In this admirable work, ignorant absolutely of the subject, I read "Part First, Structural Botany; or, Organography." I read it in the early spring, when the earth was frozen hard as iron, but that "Part First" seemed to be a door opening into a region, warm, alluring, beautiful. When spring came down this way, I made acquaintance with the "Analysis of the Natural Orders, founded upon the most obvious or artificial characters, designed as a Key for the ready determination of any plant, native, naturalized or cultivated growing, within the limits of his Flora," those limits being the entire country east of the Mississippi River, with the exception of the southern portion of Florida, where, in the Everglades, I imagine that self-taught students of botany are scarce.

The first plant that I tried to "analize" was the little "Whitlow grass," (*Draba verna*), and I thought, if all flowering plants should be as difficult as that, and make me work so hard, that I had a rough road in front of me. My mistake was in selecting so small a flower. It was all I could get. I found the name, and had it correctly, too, and without human aid. The snow was still lying in the corners of the fences, and beside the shaded banks, but the little *Draba* had struggled up, and had been captured by an ignorant youth with plenty of enthusiastic curiosity, and a desire to know. Do you suppose that I ever see that delicate white blossom, almost invisible in its minuteness, without looking at it with a feeling of affection, without having a mental vision of the youth, the library, the patches of snow abroad on the landscape, the scattered plants; without remembering the joy with which I recognized that I was right, and that *Draba verna* was the name of my new friend? "If you believe that, you will believe anything."

The admirable book to which I am referring, is Alphonso Wood's "Class-Book of Botany," and my edition is dated 1864. There is no better book, I again repeat, there can be no better book for this purpose. It is simple, direct, interesting, helpful, and altogether delightful. The Keys are the best and simplest that I have ever seen, and I have seen many. They lead the student to the object by the shortest, smoothest, most direct path. They are said to be unscientific. I suppose they are. I don't care tuppence about that. They do what they set out to do, and they do it readily and well. What more do you want? You are teaching yourself, and Wood's Class-Book will smooth many a rough place over which you would otherwise stumble and bruise your feet. Gray's "Lessons in Botany and Vegetable Physiology" is a model. It is scienti-

fic; it is learned; it is as near perfection as anything of the kind can be; the Keys are painfully scientific, dealing with minute points that terrify the teacher of self, and often bother the teacher who is not self-taught. With a professional instructor at one's elbow, Gray is perfection, but if you are trying to teach yourself, when you see that "Manual" approaching you in the road, cross over to the other side, and be spry in your movements or that book will trip you up. But with Wood's "Class-Book of Botany" under your arm, you may meet the "Manual" boldly, while you politely remove your hat, and pass on with a smile of welcome, and a feeling of reverence for so perfect a work of science. But let it end there, and cling faster to Alphonso Wood, A. M., for he delights to help you over the hard places.

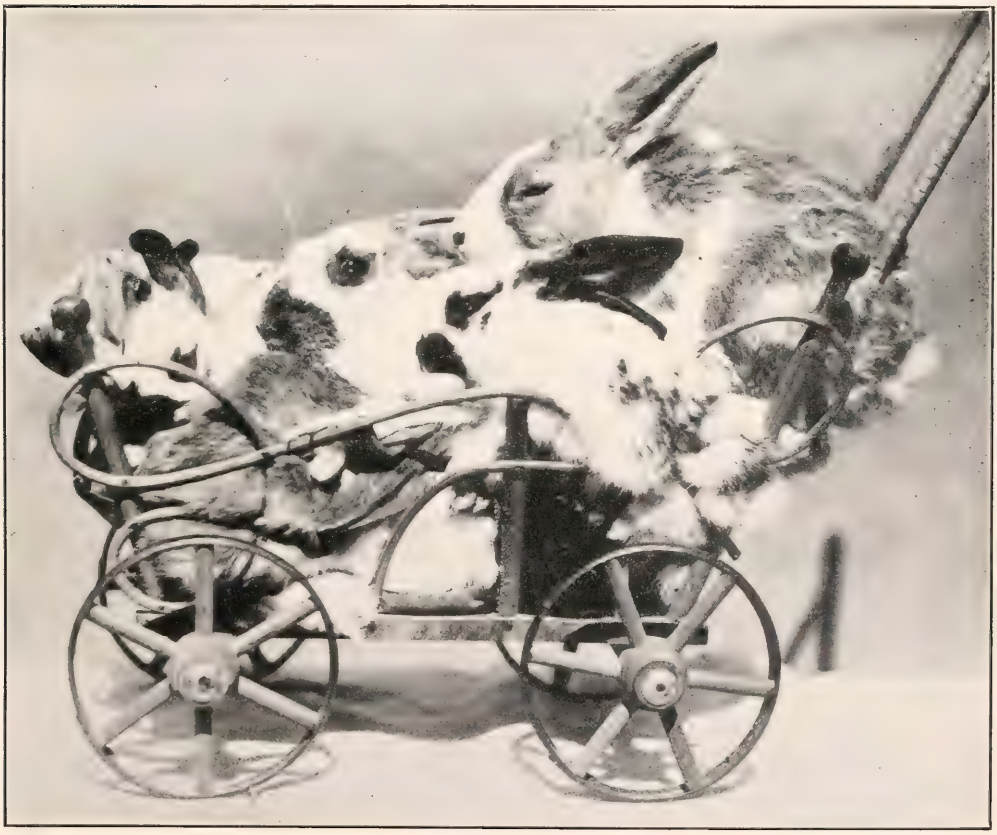
By all means let us teach ourselves botany. There is no trouble about doing that. It means a little mental labor, but it is delightful labor, and the result is——!

I also know a little somewhat about studying the trees, and I know the best book in this country for that purpose. But I don't want to tell everything I know all at once.

Yours truly,

"PETER PETERHOFF."

DOMESTICATED NATURE



"THERE'S ALWAYS"—NO, NOT ALWAYS—"ROOM FOR ONE MORE."
A doll carriage full of English rabbits taking a ride very contentedly.

THE AGASSIZ ASSOCIATION

Were other argument needed, I should find it in the great addition to the enjoyment of life which results from an early acquaintance and constant intimacy with the wonders and beauties of external nature. For *boy and man* this intimacy is a source of ever-fresh delight.—Charles William Eliot, LL.D., President of Harvard University.

PERSONAL

I earnestly solicit your aid in continuing and increasing the work of The Agassiz Association. Those, to whom this appeal may come, not familiar with this work, may learn of its importance by carefully reading the following letters from prominent educators and naturalists. Please read also my "An Appeal for Co-operation" on page 264.

I receive no salary for the presidency of "The AA," nor for the editorship of The Guide to Nature. It is a labor of love---in the interests of nature and humanity. All gifts go directly to paying actual expenses. See the advertisement of "Aiding Memberships." Further particulars on application.

Respectfully,

Edward F. Bigelow.

Stamford, Conn.



From David Starr Jordan, President of Leland Stanford Junior University. California.

To the President of The Agassiz Association:

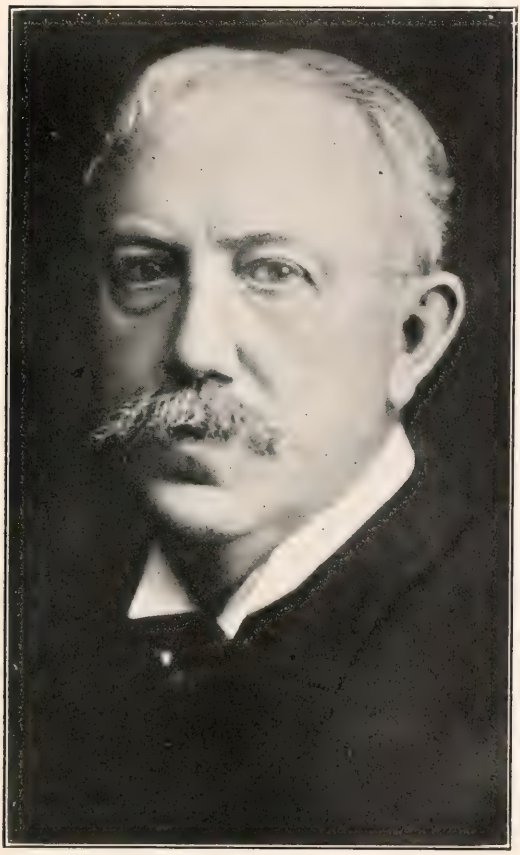
DEAR SIR:

I have been acquainted with the work of The Agassiz Association from its very beginning.

There is no kind of intellectual training more valuable than that of learning to see what lies about us and also what the different objects seen sig-

nify. Every fact has a meaning. It is part of the relation of cause and effect; and the great students of nature are those who have been able to see the fact and to look behind it to the principle or law or cause of which it is a visible result. I regard your Association as one of the most important educational institutions of this country.

I congratulate you on finding in it so valuable an opportunity, and I congratulate the boys and girls of this country on finding so admirable a leader.



DAVID STARR JORDAN

President Leland Stanford Junior University. California.

"I regard your Association as one of the most important educational institutions of this country."

In an address at Buffalo some years ago, I had occasion to say:

The first relation of the child to external things is expressed in this: What can I do with it? What is its relation to me? The sensation goes over into thought, the thought into action. Thus the impression of the object is built into the little universe of his mind. The objects and the action it implies are closely associated as more objects are apprehended, more complete relations arise, but the primal condition remains—What can I do with it? Sensation, thought, action—this is the natural sequence of each completed mental process. As volition passes over into action, so does science into art, knowledge into power, wisdom into virtue.

By the study of realities, wisdom is built up. In the relations of objects he can touch and move, the child comes to find the limitations of his powers, the laws that govern phenomena, and to which his actions must be in obedience. So long as he deals with realities, these laws stand in their proper relation. "So simple, so natural, so true," says Agassiz. This is the charm of dealing with Nature herself. She brings us back to absolute truth so often as we wander.

So long as a child is led from one reality to another, never lost in words or in abstractions, so long this natural relation remains. What can I do with it? is the beginning of wisdom. "What is it to me?" is the basis of personal virtue.

Very truly yours,

David Starr Jordan.

From Prof. Marcus E. Jones, Salt Lake City.

There is no work ever undertaken outside of the proper home circle and the school that has had such a tremendous influence on the development of the youth at the critical period as the AA, unless we accept the Christian Endeavor, and I except that only because its influence is purely religious, which is higher than any other can be. The enthusiast devoted to the AA often considers the influence of this organization paramount to all others because it has changed for good the courses of thousands of young lives, but we must not wholly forget the work of loving fathers and mothers, teachers and friends who have laboriously prepared the ground for the AA and made its climax possible.

From Wm. Whitman Bailey, LL.D., Brown University, Providence.

In this material age, and among a money-making people, **a great light shone out to illumine the dark places. It was shown that life had nobler aims than simple gain.** Every new Chapter was a mission doing good work.

From Frederick LeRoy Sargent, Harvard University, Cambridge, Mass.

It was **an important event in my life when I joined the Association,** and I regard the opportunities which it has afforded for giving and receiving help in the study of nature as of high value.

From Chas. F. Holder, Pasadena, Calif.

To my mind there is no educational work going on in the country more valuable and far reaching than this. If it was not for this, a greater part of the work of zoologists (specialists) would never reach the public—the people. I have been familiar with the work of the AA since its inception, and no society has done so much to interest the masses of the people in nature and nature study, and I should consider it in the light of a public disaster if this great work should not continue.

The study of nature in its broadest sense is to my mind an absolute necessity; it is a humanizer, a civilizer, a broadener and of the greatest importance to the public. I can see in it great possibilities for the American people. Every town and village in this country that has a church should have an Agassiz Chapter. The very name is an inspiration and a spur to higher education.

From B. Kropotkin, Russia.

Is it necessary to insist on the benefits of the Agassiz Association, or to show how it ought to be extended? **The greatness of the idea.** is too clear. The Agassiz Association has a brilliant future.

BETTER CALCULATED TO ATTAIN THIS END THAN ANY OTHER LARGE MOVEMENT.

BY PROF. RALPH S. TARR, CORNELL UNIVERSITY, ITHACA, N. Y.

I am in entire sympathy with the efforts that you have in hand, to extend the influence of The Agassiz Association along the lines which you mention, and moreover, I am gratified over the results that you have accomplished. To interest the youth of the country in the study of Natural Science is an important work, provided it is sanely done. It seems to me that the objects and methods of The Agassiz Association are better calculated to attain this end than any other large movement that has been set on foot. I wish you every success in your work.

SPECIAL APTITUDE FOR THE WORK.

BY WILLIAM TRELEASE, DIRECTOR THE MISSOURI BOTANICAL GARDENS, ST. LOUIS, MO.

I have no objection whatever to your quoting me as being heartily in sympathy with the type of nature work that you are doing and the way in which you are doing it. I do not know anyone else who has just your type of aptitude for it, and wish you all success.

A HOME POINT OF VIEW.

[From The Stamford Advocate, Stamford, Conn.]

The new president of The Agassiz Association brings to his important work a large fund of experience, great enthusiasm and ideas which commend themselves as sensible and practicable. There is no salary, and the only remuneration is the joy of doing good, which must be regarded as ample. Every cent is used for the furtherance of the work it is trying to do, in stimulating, encouraging and leading in the study of nature.

How Dr. Bigelow finds time, with his experiments, his lectures, his writing and teaching, to do the additonal work, is a wonder to those who know him. It is accounted for by the fact that he is an indefatigable and enthusiastic worker, and is doing the work he likes best.

IT KEEPS ONE YOUNG.

BY THE REVEREND P. B. PEABODY, BLUE RAPIDS, KANSAS.

I could assure the comparatively mature people whom you are trying to reach that just this sort of study, indulged in as an avocation, has made me, at fifty, a younger-feeling man than I was at thirty-five. I could assure them that some of the keenest delights that have ever come to me have come through mere soul-contact, by way of correspondence with men and women whom I have never seen; while yet a bond indissoluble has been created through the existence and the mutual activity of this kindred spirit.

The Correspondence System of Education is a demonstrated success. The entire plan of the AA, as I apprehend it, is but an amplification of the same idea. I am a firm believer in co-operation. It can accomplish wonders. It can baffle the impossible. It requires only money to make such plans as yours a reality. With a wise conferential combining of varied plans, all tending toward the same end, all directed and intelligized by a strong and wise unifying masterhood, I am confident your ideas are capable of realizing an American Academy of Nature Study that will be at once comprehensive and exhaustive.

One great desideratum, it seems to me, in the practicalizing of your plans, is to have the strong personality of each instructor, lecturer and field director potentialized by giving it the broadest possible content. The possible value of this I often feel in my professional work. Never ambitious, ever abhorring place-seeking, my own work has ever lain in by-ways. I have preached, all my life, to small congregations. Yet I have, on occasion, in some city church, or when preaching to union congregations or school commencements, before large audiences, felt most deeply the thrill, the uplift, the energizing that come through the reinforcement that is engendered by the presence and the sympathetic activity of kindred spirits. If only you can make the field broad enough and man that field with personalities of sufficient capacity for inspiring others you will do a great work. But this will require money.

Your plan seems to be the Chatauqua Idea writ large. Adequate leadership, able and devoted helpers, with the means sufficient to bring these into contact with the masses of those that are hungering after the food that is yet fairly within their reach—these will mark and make possible the realization of your plans.

The dominant marks of our Age, in the world's broader life, are vain ambition, feverish desire, shallow attainment, flippant smartness, insincerity, hypocrisy. On the other hand, the mighty impulse of the pendulum swing back to Nature, Sincerity and Truth, are already too real to be scoffed at; and too strong to be disregarded. The time is ripe. It is the psychological hour. The question is,—whether we shall let this powerful drift and trend be swung by the fakirs and the grafters; or whether we shall see to it that it be led, energized, directed, glorified by the personalities of men and women to whom Nature, in many of her manifestations, is the unspeakably attractive and blessed outward form of the Almighty. That's just what it is. There are some of us,—are there not?—that have come to *know* it; and to find a large measure of our essential peace in this knowledge; and in its realization of riches in our own hearts and lives.

One feels utterly abashed, completely overwhelmed with his own littleness when such plans as yours are mooted and discussed. Personally, I owe so very much to men and women that I have never met that I have grown sure that such contact, only, with the greater intimacies that are begotten of it, can lift one above the shrinking lethargy that comes with the sense of our own smallness and make the doing of great things possible. The attainment of this is, I confess, my one worldly ambition. The moulding of other lives has become a passion with me. And this as I understand you, is the great underlying motif of your plans.

I do hope that I have said, and not been too late in the saying, even just one or two little things that may help a little in the realizing of your plans. It seems presumption in me to *suggest,* even, the possibility of my being able to be helpful, in your outlined field.

HEARTY APPROVAL OF AA METHODS.

BY FREDERICK LEROY SARGENT, SHIRLEY, MASS.

I wish to assure you of the admiration I feel for your work in behalf of The Agassiz Association, and to express my hearty approval of the methods you propose for extending its benefits.

What you say of circular instruction especially excites my interest. I believe the method has great possibilities.

When I was a beginner in the study of Natural History I wasted much time, and met with many disappointments, for lack of such suggestions as your circulars would doubtless offer. I have come to the conclusion that inasmuch as the secret of thorough and profitable observation lies in the habit of asking oneself appropriate questions regarding the objects observed, it follows that the best training in the art of observing may be gained through the use of carefully prepared schedules of questions which may be answered by examining the objects to which they refer. I trust that such schedules, prepared by experts, will abound in your circulars.

APPROVES AA CLEARING HOUSE.

BY RICHARD C. MCGREGOR, BUREAU OF SCIENCE, MANILA, PHILIPPINES.

Your idea of having working headquarters for the AA as outlined in the second section under "Methods" in the AA Manual appeals to me as possessing great possibilities. The Home Office might act as an efficient museum Clearing House for the exchange and loan of specimens among individuals, Chapters and schools all over the world.

Specimens which are common in one locality are rare in others. The young AA member who lives in the Rocky Mountains has little chance to examine the common animals of the seashore; the sea urchin, the sand dollar and the hermit crab are as strange to him as are the dodo and the saber-toothed tiger. But he has petrified palm, galena, horned toads and other treasures which would be a delight to the member who lives near the sea. Here is where the AA can be of great service.

Let the Home Office or Museum re-

ceive sets of carefully prepared specimens and distribute them to chapters and schools. For such service there need be no charge above the cost of postage and packing.

The AA has, as you suggest, a large opportunity to help teachers of nature study and as the AA becomes better known to the teachers it becomes better known to their classes from which we may expect to recruit our members. So by all means the AA should help the teachers.

I believe that the AA should be widely advertised in such a way as to attract the attention of young people. There are yet thousands of individuals who have not heard of this great organization and who need only to be set in the right path to become efficient students of nature. To arouse interest in nature study is doubtless an important function of the AA but I feel that the directing of this immense energy along proper lines of interest is quite as necessary. I collected hundreds of shells, insects and minerals in haphazard fashion long before I knew the value of doing it in the right way.

In the old AA Handbook some things were not sufficiently emphasized. I refer first to the necessity of preparing data for specimens in such a way that they may be not only of educational value but of scientific value as well. A starfish in any condition is a treasure, but with the addition of particulars as to locality, date, etc., it becomes a scientific specimen of current worth.

In the second place I would emphasize the necessity for much fuller instructions for the collecting and preserving of specimens than were given in the old AA Handbook as I remember it. A collection of leaves from trees is interesting and instructive, but is of little or no scientific value unless the leaves are preserved on their stems and are accompanied by the fruit and flower; with the addition of certain data they become scientific specimens. The trouble taken to prepare specimens in this formal way promotes the habit of order and gives an added interest to the work.

While the AA member is becoming familiar with natural history in a general way he can and should be of use to the specialist. I will mention only one case.

Beside the large garden variety of earth-worm, which has a wide distribution, there are a great number of small earth-worms which are very local in their habitat. These are found in a great variety of situations. Some live under the bark of fallen trees, others burrow in damp moss on the banks of forest streams and still others live in the sandy beds of rivers. The AA might easily amass a splendid collection of these interesting worms which any specialist in the group might be glad to study and describe.

I believe the AA is destined to continue its good work of showing people, young and old, the interest to be found in the common things of nature and in the study of the relations and adjustments among them. An interest in the beauty of a butterfly and its development from the egg are followed, under guidance, by a study of the dependence of the caterpillar upon its food plant, the relation between the adult insect and the blossoms it visits and between the egg and the microdipterous insects which fatten on its contents.

A real interest in any branch of nature study becomes a source of relaxation from work and a saving grace from the curse of idleness. A naturalist is happy in any situation. Marooned on an island he grieves not for companions but watches the fishes of the sea or counts the trees of the forest.

A CORRECTIVE AND A SOLACE.

BY E. T. BREWSTER, ANDOVER, MASS.

I cannot state too strongly my belief in the soundness and value of the ideas for which the AA stands. For the young it seems now the single efficient and wholesome corrective for the craze for athletics which is now-a-days (I speak as a schoolmaster) playing the mischief with all intellectual interests among boys. For the adult, nothing save only a love for reading is such a solace.

All this, however, has already been said so well by yourself and others, that I hesitate to say it again. Let me only assure you of my hearty sympathy with your ideals and my sincere belief in the principles of the AA.

OUR SCHOOL SOCIETIES.

BY H. H. BALLARD, PITTSFIELD, MASS.

As the AA has become better known, it has found a wide field of usefulness



HARLAN H. BALLARD.
Pittsfield, Mass.
Originator and Ex-President of The AA.

in connection with schools, both private and public. Many teachers who have not been able to find a place for natural science in the ordinary curriculum, and who have yet felt that their pupils should not grow up strangers to the flowers, trees, birds, and butterflies, have been glad to devote an hour once a fortnight to the guidance of a meeting devoted to these studies. In almost every school may be found, at the least, six of the more intelligent boys and girls who will willingly spend an evening now and then in united study and discussion. The young are naturally fond of collecting. Most school committees will cheerfully grant the use of a room for the meetings, and many will even provide suitable cases for the specimens. In each of the several hundred schools in which branches of the Agassiz Association have been organized, the resultant work of personal observation has had a marked tendency to counteract the evils of rote-work and routine. In most cases cabinets have been secured and have been filled with specimens collected by the pupils themselves within a radius of five miles of the school-house door. Visit such a society and ask to be shown representations of the local fauna, flora, or mineralia. The young men and women will show you collections carefully prepared accurately labeled, diligently studied, highly valued, and exceedingly valuable. The Agassiz Association does not so much care for rarities or monstrosities. Our cabinets are neither junk-shops nor dime-museums. Our purpose is rather to learn about the stones by the roadside and in the quarry; to become familiar with the plants we pass on our way to school, and with the insects that feed upon and fertilize them; to get on speaking terms with, and out of all cruel relations to, each warbler of the orchard and the wildwood; to discover what fishes swim in our brooks, what shells lie on our beaches and hide in our groves, what invisible animalcules live in our ponds and ditches, what stars shine in our sky. It was a dream of Louis Agassiz himself to see American youth early led into the pleasant paths of natural science; to see them forsaking all foolish and wanton sport for the sake of a wise and loving study of the works of God.

Every teacher has at some time felt how delightful it would be if she could only lead her pupils to see the inexpressible beauty that lies hid from unwakened eyes in pebble and leaf and wing. But many have been discouraged from making any serious endeavor from fear of failure. It is better to try and fail, than fail for fear of trying. It must be admitted, however, that there are usually serious hindrances in the way. First of all, many teachers feel that they are already working at too high a tension. Then others, not having enjoyed special training in natural science, feel a modest reluctance about attempting to train others. In other cases it is found diffi-

cult to inspire and maintain among the young a strong and growing interest in these matters. The first of these objections can be met by making the association-work an avocation instead of a vocation; a calling from work, instead of a calling to it. Take your pupils with you for an occasional afternoon, if you can get leave of absence; and, my word for it, you and they will fare none the worse at the end of the term for the exchange of one or two grammar recitations, or examinations in geography, for a little practical knowledge of what lives and moves and has its being out of doors, and a few lungfuls of crisp June or October oxygen.

Your own ignorance, if that is what you do own on these matters will the better enable you to study with your pupils; and next to instruction from the most gifted master, nothing is more inspiring than such friendly companionship in learning. As for failing to interest your pupils, remember that a taste for the pure pleasures of natural science, like a taste for olives, must be cultivated by persistent tasting. After one or two excursions, followed by a careful study of the specimens obtained, with the personal use of microscope or blow pipe, enthusiasm generally grows like purslane. You will find, too, that the Association will be a great help to you. We have now about fifty scientific specialists always ready to aid the members by answering their letters of inquiry, and by determining their specimens for them, free of cost, save postage.

A boy in a grammar school in the uttermost parts of Dakota becomes interested in fishes. He finds the common varieties that he knows, and studies them. By and by he takes in his net or on his hook a stranger. He finds no account of him in the small zoology in the school library. The teacher cannot help him. He studies the fish with his eyes, examines fins, and scales, and skeleton. Then he prepares a description as accurately as he can, perhaps aided in this by the teacher, and sends it with a rude sketch, it may be, to one of the gentlemen who kindly assist our students. In a few days he receives a letter, giving him the name of his fish, and, what is better, the name of a book from which he can learn much more about fishes than from any volume that ever before found its way into his village. How he is encouraged by this graceful sympathy! He hoards his earnings till the book is bought. He studies it by candlelight after the chores are done. He masters it and presents it to his little society, where it becomes the nucleus of a scientific library, which ten years from now may require a building to protect it. By the time this boy has finished school he knows more about the fish in the local waters than his parents or instructors, and he has become fired with ambition to go to some place where he can meet men who know enough to teach him more. He enters a college or higher scientific school ,and becomes, before many years are gone, himself a specialist, ready, nay eager, to help other poor boys in other isolated places. This is no fancy sketch, but has been realized over and over again since the Agassiz Association was founded in 1875.

"NO OTHER THAT APPROACHES IT."

BY GEORGE W. CARVER, DIRECTOR DEPT. AGRICULTURAL INSTRUCTION AND EXPERIMENT STATION, TUSKEGEE INSTITUTE, ALA.

As to the objects and aims set forth by the AA, it seems to me that they are very clear and concise, and well put. I do not know what could be added to improve them. Each one sets forth a peculiar need and mission of the association which, to my mind, is unquestionable. Let us hope that this will be one institution for the training of the many. I know of no other that approaches it. It certainly shall have my support, as far as I am able to render service.

In the election of Dr. Edward F. Bigelow as president of The Agassiz Association, the trustees have bestowed a well-earned honor and secured a most enthusiastic nature lover as executive head.—The School Journal, New York City.

AN APPEAL FOR COOPERATION

The Agassiz Association is the oldest, largest, most extensive and most efficient organization in existence for disseminating a knowledge and a love of nature, after that knowledge has been expressed in a plain and simple way, so that even abstruse facts in natural science become readily "understanded" by the young or non-scientific people. Observations are made interesting without being belittled or degraded by imaginary assertions that the writer hopes may be true, that he thinks may possibly have occurred, and that at last he persuades himself to accept and then asks his reader to believe. The AA deals in facts, but deals in them, not like a museum with all specimens pinned to the wall and labelled in Latin, or pickled in jars and again labelled in Latin. The AA deals in facts described in a plain and simple way, but always in facts, and it speaks only in the observer's native tongue. Thus far it is "popular science," and further than this it does not aim to go. It uses the microscope, but not to investigate the action of the nucleus in some infinitesimal creature visible only under a magnification of a thousand diameters. It turns aside from that kind of science, valuable as that is to certain investigators. But the AA will, under a low magnifying power, examine with the greatest delight a bit of feather from a hummingbird's breast, and cry aloud with joy when the brilliant colors first salute the eye. Then by accident it is reversed under the lens, when, lo! every trace of color has vanished. The feather a moment before blazed in hues that dazzled the amateur microscopist's vision. Now, that same bit of tissue is dull, unattractive, dead. Why? Does the reader know? It is a simple fact, but a fact. The explanation is equally simple, but does the reader know it? The "learned scientist can explain it in ponderous words that mean no more than the simple words of the most youthful member of the AA, who discovers the fact for himself and explains the reason in his own way. The AA is scientific, but it is not ponderous. It is truthful, but it is attractive, because it allows the observer to observe in his own way and thus to teach himself how to observe; because it allows the reporter to report in his own way, and thus to learn how to do so properly. In this sense the AA is 'popular," since while it tries to be accurate, it at the same time tries to be plain, simple and readily understood. It aims to develop, not to repress nor to suppress. Many a budding observer has been both repressed and suppressed by having his questions sneered at, and himself told to "clear out." Whatever may be the shortcomings of the AA this is not one of them. The AA tries to be helpful and encouraging, knowing that *appreciation and love of nature is one of the most consoling, the most comforting qualities that can be fostered within the human heart and mind.* Cannot the reader help us? Does he not sympathize with us and with the purposes of the AA? Will he not kindly think it over, and then act, and act generously?

As president of "The AA" (as we are fond of calling it), knowing its past and the possibilities for the future, *I firmly believe there is no other organization in existence whereby labor and money will do more for the good of humanity, especially of youthful humanity.* No officer has ever received a salary. Our only remuneration has been the "joy of doing a great and good work." For more than eighteen months I have done the work of the executive office, and for several months that of the editorship of the official journal, THE GUIDE TO NATURE, at an already overcrowded desk in my own home. My small back yard in a thickly settled part of Stamford has been for years vastly overcrowded with my work as "Nature and Science" editor of "St. Nicholas," and in original experimenting as a general naturalist. But here, for two seasons, in addition to the burden of the experiments, I have taken the illustrating and the question answering of the AA. To earn a living for myself and family, I am necessarily away from home for much of the time on lecture tours and in school work. This intermittent labor at the desk and in the

laboratory has prevented the work of the AA from reaching its highest efficiency. I need more room, better facilities and an assistant. To me there are no inducements in my AA work that should not apply to any lover of nature and of humanity. I therefore appeal to you to cooperate in this work, to aid in the erection of "The AA Home," as described in the manual, to employ assistance and generally to meet the expenses of the work as outlined in the manual. A gift may be expended at the discretion of the management (and I advise this) or it may be a Special Fund to be invested along certain limited lines, as the donor may desire. The records of receipts and expenses may be examined by any contributor. In the case of a Special Fund, a report will be rendered to the contributor monthly or quarterly as he may desire.

Will you please aid me in this great work? If desired, I will gladly tell you more in detail of my plans.

Yours very truly,

EDWARD F. BIGELOW.

PHOTOGRAPH OF NEST OF MOURNING DOVE.

This excellent photograph of nest of mourning dove was taken by Dr. R. W. Shufeldt. The nest is a flat structure, loosely put together. The bird usually builds in the lower branches of a tree, generally within ten feet of the ground, rarely on the ground, in the eastern states.



NEST OF MOURNING DOVE.
Photograph by Dr. R. W. Shufeldt.

LITERARY AND BIOGRAPHICAL

The Sport of Bird Study. By Herbert K. Job. New York: Outing Publishing Co., 1908.

"Of making books there is no end" may be truthfully said of bird-books in particular, but if, as a result, more bird-lovers are thereby made, there is no need to call a halt. Mr. Job has given us a companion book to "Wild Wings" which should win many a reader to the ranks of bird students. Here, instead of leading us north, south and out to sea, the author has confined himself to the home birds of our North Eastern States, doing for the East what Finley has done for the far West.

The arrangement is systematic, thirteen chapters, treating of as many major divisions of our birds, beginning with the upland game birds and ending with the thrushes, while a final chapter disposes of the few inland water birds.

Mr. Job writes with a more personal note than heretofore, striving, and rightly, to give in his text, not so much descriptions of plumage and other hand-book facts, as to present a series of actual experiences and adventures which he and "Ned" enjoyed in their sport of bird study.

Although Br. Job's book is written avowedly "for young or active people," and as perusal shows, for amateur bird-students, yet he touches upon a number of facts of unusual interest of which we would wish more details. For example, the complete change in character of nest of the kingbird which built on the fence-post, and the yearly return of apparently the same pair of bords as in the case of the nighthawk which was photographed year by year from 1900 to 1907. Such longevity in an individual bird is most interesting, and we wish that the author had emphasized this and certain author had emphasized this and certain other phases of the life-histories of birds concerning which we are woefully ignorant. If ambitious young ornithologists could have access to a "chapter of ignorance," it would inspire them more than any other appeal. In another edition of this book, the reviewer would like to see an appendix of "one hundred and one gaps in the life-histories of our common birds!"

Mr. Job's enthusiasm is contagious, and there are few dull pages. When a man will work three days, "walking twenty-four miles and riding sixteen" to photograph a ruffed grouse on her nest, the details are worth reading! With all his love of birds, the author is not over sentimental about them. His estimate of the English sparrow is that it is a foreign pest, "which does not deserve to be considered as a bird, but rather as a feathered rat, a pestiferous mongoose to destroy bird life and drive out our beloved native birds." Again, in an introductory chapter he argues the case of gun versus camera sanely and well. "Of course there's nothing wrong in shooting lawful game in moderation, but it's simply this, that the new way is so much better than the old that we dont care for shooting. Gunners can hunt only in the fall, but our hunting lasts the whole year. Their game,



Nest and brood of Quail. "Like little brown leghorn chickens" (p. 24).

too, is limited to a few kinds, while we have every sort of bird that flies."

Mr. Job's photographs, with few exceptions, are excellent. Those of the flicker, kingbird family, tree swallow, vireo and alder flycatcher are especially good. The labor they represent can be imagined only by those who have worked in this field—and



Broad-winged Hawk. "In the act of entering the nest with a chunk of bark" (pp. 42–3).

the pleasure derived cannot be even faintly estimated by the unfortunate who has never seen a live bird on the ground glass of his camera. The whippoorwills, old and young, opposite page 106, are splendid examples of protective coloration, while the Louisiana water thrush, opposite page 222, is a veritable puzzle picture.

At the end of the book is a brief table of classification of Orders and Families, a short seasonal bird calendar, and an annotated list of 216 species of birds which the author has noted in Litchfield County, Connecticut. Although only of immediate local interest, yet the list is useful as showing what may be accomplished by careful observation in a circumscribed locality. Mr. Job's book is welcome as a sane and wholesome introduction to the study of birds with glass and camera.

C. William Beebe.

Boulder Reveries. By W. S. Blatchley. Indianapolis, Indiana: The Nature Publishing Company.

This is a diary of reveries really worth recording. The book abounds not so much in observations as in thoughts showing the author's true spirit of a naturalist. Here are some specimens:

"The woods are nature's abiding places—'God's first temples'—as Bryant called them. There beasts and birds and bugs abound. There the naturalist goes when he would be alone with his thoughts—alone with God and His handiwork; and yet alone only in the sense that he is away from his fellowman. In my ramblings through these old woods, I seek no company but my own. On such a day as this three is a multitude; two, a crowd. By myself I can ponder. By myself I can get closer to the birds, flowers and insects. By myself I can dream dreams of days that are gone—of days that perhaps will be."

"I measure my years by their Aprils, Junes and Octobers."

"I like at times to be where no human soul knows where I am—alone and unnoticed in the universe of God."

The Fairy Land of Living Things. By Richard Keaton, F. Z. S. London and New York: Cassell & Co., Limited.

In this book, the brother of the author (Cherry Keaton) shows a wide variety of "odds and ends" in photographic study of the wonderful fairyland of living things of the country side. The author tells of the habits, instincts and characters of the wild creatures that are to be met with every day in field, wood and hedgerow. He rightly claims that by dealing with the romantic and wonderful things in the lives and habits of birds, beasts and insects, young minds (and why not as well older ones, too?) are aroused, and stimulated into observing, enquiring and thinking for themselves.

Some of the photographs by Cherry Keaton are especially good. The studies of dandelions "asleep" and "awake" well portray the night and day attitude of these plants.

Insect Stories. By Vernon L. Kellogg, Professor of Entomology in Stanford University and Author of "American Insects," "Darwinism To-day," etc. New York: Henry Holt and Company.

Professor Kellogg has, in this volume of strange, true stories, succeeded in describing the habits of certain insects in so fascinating a way that there are few people, either old or young, who will not be held by its charm. Simplicity is the keynote to the studies and observations of the old scientist and the little girl who figure in the book, and their ingenuousness and the subtle humor hold one's interest as much as the marvellous doings of the little ground folk themselves.

It is a splendid illustration of how interesting a book of natural history stories may be, while yet purified of all "nature faking" and of all the exaltation of animal hero-composites so popular in recent years.

[From Special Reviewer]

When this fascinating volume was handed to me with a request for a review it seemed, in prospect, a simple matter to run through it, reading here a little and there a bit—enough to get a good idea of its handling.—Professor Kellogg's name prohibited a question of its absolute accuracy, contents, style, etc. A few moment's reading, however, utterly routed this method of procedure. From the moment one gets acquainted with Mary out collecting tarantula holes—which she assures you is quite easy when you learn how—until the last sentence is read no "skipping" is possible. Professor Kellogg's irresistible charm of handling simply compels a word for word perusal in order not to miss something good. He is amusingly careful in handling the "Instinct or Intelligence" phase of insects' acts and leaves the reader perfectly free to exercise his own judgment unbiased. Between the lines, however, one can easily read his inclination to the "Intelligence" phase of the matter.

Although the doings of these little creatures were nearly all familiar from observation the stories are so interestingly told, so true to facts and so vivid in description that it was almost equal to actually seeing what he so well describes.

Ably supplementing the text are the excellent and accurate illustrations—all of which are full page half-tones. These show at a glance that the little creatures were very carefully studied by the artists. The feet and legs, those parts of insects that are usually so inaccurately drawn, are shown in these drawings with gratifying fidelity.

So natural is Mary that no doubt exists in the mind of the reviewer that she is a portrait from life,—the link that binds all the widely varied stories into a connected narrative. Through her quaint ideas and questions just enough fancy is introduced to inspire additional interest in the facts of the stories. Before many of the stories are read you will be equally insistent with Mary "What can I see?" "What can I see right away;—to-morrow?"

"Mary you can—see—to-morrow,"—and I think rapidly,—you can see—to-morrow,"—still thinking,—"ah, yes—yes you can; you can see them to-morrow."

"But what can I see to-morrow?"

Yes, that's just the question you will ask yourself for you will have become convinced that all out-doors is simply full of interesting things to see and determine to go see some things for yourself—but you will finish the book first. Before the book is ended you will be ready to believe that if Professor Kellogg and Mary went exploring among the letters of the alphabet you could confidently expect twenty-six interesting stories.

Naturally a reviewer thinks he has not done his duty unless he register a complaint. There is disappointment in the last sentence which should read "End of Vol. I," instead of "For this is the

END

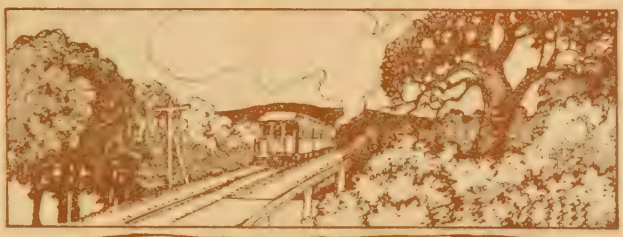
of this rambling, talky, little book."

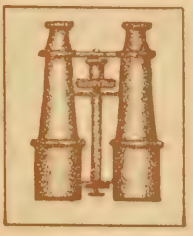
CLEM B. DAVIS.

How to Attract and Protect Wild Birds. By Martin Hiesemann. London: Witherby & Company, 326 High Holborn.

This is a practical guide for all who wish to attract the birds to their doors and induce them to nest in their gardens, whether large or small. It shows that these birds are most useful in keeping down the insect pests which are so harmful to trees and shrubs. In this connection also the attention of municipal and urban councils may be drawn to the advantages which would accrue to trees and plants from the use of nesting boxes for birds in public parks and open spaces. The methods described are simple but efficient.







The Guide to Nature

Stamford, Conn.
Edward F. Bigelow, Editor.

Vol. I NOVEMBER, 1908 No. 8

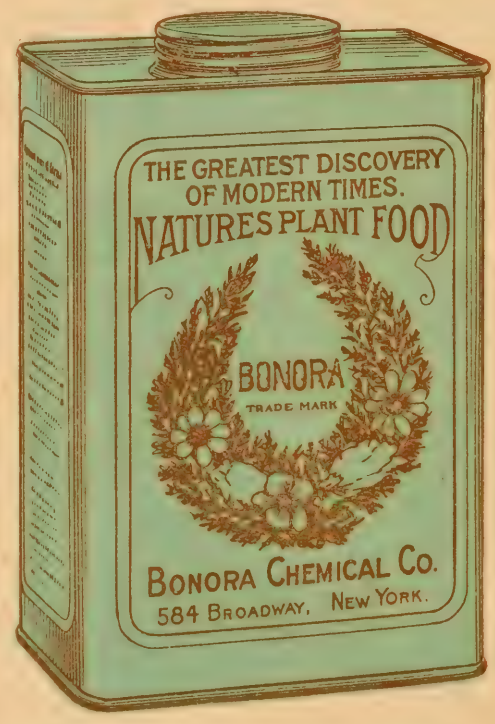


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NOT a stimulant but an added quality to Nature, which becomes the life of the plant, making it to plant life what blood is to human life. Discovered by an English chemist, and now creating great sensation throughout the land. It is now being shipped to the remotest corners of the world. Used and endorsed by the greatest authorities in America, among them Luther Burbank, Eben Rexford, H. B. Fullerton (called the Luther Burbank of Long Island) and many others. Used by the gardeners of the following prominent people: Hon. Cornelius N. Bliss, Jacob Schiff, M. C. D. Borden, Geo. W. Vanderbilt, John D. Rockefeller, Hon. Joseph H. Choat, and a great many others.



"BONORA" is made of absolutely pure chemicals, immediately dissolves in water, and when sprinkled around the roots of the plant becomes available at once. "BONORA" will make your winter plants, hothouse plants, etc., bloom in profusion, giving them healthy color and wonderful growth. By its use plants are made to grow as if in the Tropics.

If your florist does not handle it, order direct. Put up in handsomely decorated cans, all sizes, as follows:

1 lb.	- - -	28 gallons, post paid	$.65
5 lbs.	- - -	140 " - -	2.50
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PUBLISHER'S NOTICES

The Guide to Nature.

EDUCATION AND RECREATION

AN ILLUSTRATED MONTHLY MAGAZINE FOR ADULTS, DEVOTED TO COMMONPLACE NATURE WITH UNCOMMON INTEREST.

PUBLISHED BY THE AGASSIZ ASSOCIATION. OFFICE: 113 GROVE ST., STAMFORD, CONNECTICUT

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Vol. I **NOVEMBER, 1908** **No. 8**

GOOD WORDS THAT ARE EFFECTIVE.

New Haven, Connecticut.

Dr. Edward F. Bigelow :—

The sample copies of THE GUIDE TO NATURE have interested the writer immensely. Kindly put us down for one year's subscription.

We will be pleased to use a half page of advertisement in your journal for the forthcoming six months.

Very truly yours,

THE ELM CITY NURSERY COMPANY.

AN IDEAL NEW YORK HOTEL.

The readers of THE GUIDE TO NATURE who have occasion to visit New York City will find the Hotel Cumberland at the corner of Broadway and Fifty-fourth street a very satisfactory city home for a day or longer.

This hotel does both a transient and a family business and has first-class people as patrons. The rates are reasonable. The location is central and is rapidly becoming more so. Within ten minutes' walk or easy access by Broadway surface cars or the subway are twenty theatres. It is near to everything and yet just out of the noise and confusion.

The rooms are good and are all practically outside rooms and every room has a bath room and every bath room has an outside window.

It is perhaps the only hotel in New York City with all hard wood floors and Oriental rugs and it has the best large collection of rugs in the city.

The windows are fitted in summer with fly screens.

The restaurant makes a specialty of good food and good service at moderate prices.

The manager of THE GUIDE TO NATURE voluntarily publishes this note of commendation simply because the hotel deserves it. Messrs. Harry P. Stimson (formerly of Hotel Imperial) and R. J. Bingham (formerly of Hotel Woodward) know how to well manage a hotel. Good work in any line is always worthy of praise.

A GREAT OPTICAL INDUSTRY.

Recently the Royal Photographic Society in London opened its 35th annual exhibition, which occurrence always forms one of the important events in English photographic circles. Not only does this exhibition bring every year

something new and interesting in the matter of pictures, but also in the various photographic apparatus' and lenses. Among the latter, a very interesting historical article, viz.; the 250,000th Double Anastigmat recently completed by the C. P. Goerz Optical Co., of Berlin-Friedenau. It constitutes an eloquent testimonial for the enviable reputation of these instruments and it is not only a matter of congratulation to he Goerz Optical Co., but also to the entire optical industry of Germany, that one quarter million high grade precision instruments have been placed upon the market.

THE STUDY OF HUMAN NATURE.

The Phrenological Journal, established 1838, is widely known in America and Europe, having been before the reading world over seventy years and occupying a place in literature exclusively its own, viz., the study of Human Nature in all its phases, including Phrenology, Physiognomy, Ethnology, Physiology, etc., together with the "Science of Health," and no expense will be spared to make it the best publication for general circulation, tending always to make men better Physically, Mentally and Morally. Parents and teachers should read the "Journal," that they may better know how to govern and train their children. Young people should read the "Journal" that they may make the most of themselves. It has long met with the hearty approval of the press and the public.

Terms, $1.00 and 5s. a year, 10c. a number.

Send amount in Express, P. O. Orders or Drafts on New York. Agents Wanted. Send 10 cents for Specimen Number, etc.

A WONDERFUL PLANT INVIGORATOR.

Especial attention is called to the advertisement, on the second cover page of this issue, of "Bonora," the wonderful plant food and stimulant. This was discovered by an English chemist and has met with the highest praise by all who have tried it. The Conard & Jones Company, the well known nurserymen, write of it as follows:

"We have made a careful test of 'Bonora as a fertilizer for plants grown indoors, and we can endorse all that you claim for it, as a quick acting, lasting and odorless fertilizer. We can also say it excels all other fertilizers that we have tried. It seems to suit all kinds of plants, but as with every other fertilizer the user must be careful not to overdose; some plants stand much more than others, and it is always better to commence with small doses, and increase, as experience shows what amount each kind of plant requires."

Eben E. Rexford thus commends it:

"I have still as good an opinion of Bonora as I ever had. We have several old roses in the greenhouse that we have been using it on, and the result is simply wonderful. I have a Marchael Neil growing in a ten-inch pot that, for a long time, simply stood still. Last winter, under the influence of Bonora, it made a vigorous growth, and had forty buds and blossoms at one time, and has continued to bloom well ever since. I have La France in the greenhouse, and it has made almost as good a record. At the present time it has twenty buds and blossoms, with more coming. Ferns, callas genistas, heliotropes and geraniums respond most satisfactorily to its influence and the best of it is—they do not experience any relapse, as most plants are likely to after being stimulated to vigorous growth with ordinary fertilizers. I have an Aspidistra in a twelve-inch pot—a perfect mass of roots, with not a particle of soil showing. I have fed this with Bonora, and it is sending up large healthy foliage, as if it had been repotted and given fresh soil and more root-room."

Bonora is also strongly recommended by John Lewis Childs, Luther Burbank and others.

The "Guide to Nature" desires that its readers procure some of this new preparation, experiment with it and report results. We have discontinued the sale of The Sachs Tablets for use with plants in soil. Bonora is far more advantageous and beneficial. Bonora is especially good for house plants, in doors and out of doors, for vegetables of all kinds, etc. Try it and see how it works.

(FROM THE NEW-YORK TRIBUNE.)

An English chemist has, after thirteen years of incessant and toilsome study and experiment, evolved a formula which is in the opinion of many persons of more intrinsic value to man than the alchemist's dream—transmutation of metals—could prove, were it ever realized; it is one which supplies both food and drink

to plant life, with a maximum of effect and at a minimum of expense. Just how much this means to mankind is shown by Professor Robert Kennedy Duncan. After describing the important role



GENISTA.
Without Bonora. With Bonora.

"fixed" nitrogen plays in supporting and moving the forces of nature, he proceeds. "Harper's". "The invaluable fixed nitrogen which we have within us, and which we are continuously using up, we must continually restore. In order to do this we eat it. We eat it in the form of animal food or of certain plant products such as wheaten bread. But plants, and animals, too, depend upon the soil for every trace of nitrogen they contain, and the soil in its turn has won it from the reluctant air through the slow accumulations of the washing rains, from the lightning of a million strikes, or through slow transformations by billions of nitrifying organisms through what, so far as we are concerned, is infinite time. Not only so, but the valuable nitrogen containing substances we employ in our civilization are in the same parlous position of depending upon the soil. Every cannon shot disperses in an instant the fixed nitrogen which it required millions of microbes centuries to accumulate. We filch this nitrogen from the soil immensely faster than it is restored by natural process, and the land grows sick and barren, and refuses to grow our crops."

The cure for this sick, enfeebled or wornout land is, as Professor Duncan shows, the returning to it in adequate degree the fixed nitrogen of which it has been so ruthlessly robbed. Providentially, as he points out, modern science has, within recent years, discovered a method of drawing upon that vast reservoir of "free" nitrogen, our atmosphere, for an unlimited supply. With the methods of converting this "free" into "fixed" nitrogen this article has naught to do; the question here considered is as to the means of supplying it to plant life, and at the least expense of time, labor and money. This, it is confidently asserted, is accomplished by the before mentioned English chemist's admixture, which has been christened "Bonora." To begin with, it is not open to the objection so often urged against commercial fertilizers, of which, it is said, 6 per cent only is plant sustenance, the balance being ground rock, which, sooner or later, will sterilize soil. Again, on the score of transportation and storing charges, Bonora, fifty pounds of which, it is claimed, is equal to a ton of commercial fertilizer, is vastly more economical—as it is also in its application.

Bonora, an odorless and stainless compound, is all plant food—plant food in its most concentrated form. Govern-



A PALM.
Without Bonora. With Bonora.

ment analysis shows it to contain several times more nitrogen than any other fertilizer, and an abundance of phosphoric acid and potash as well. Fifty pounds of

the powder make 1,400 gallons of fertilizer when the requisite quantity of water is added, and this saturated solution applied with hose, or sprinkler, waters and fertilizes the plants at one and the same time. Bonora has the added beneficent quality of both gathering moisture from soil and atmosphere and retaining it for the plant's use—indeed, so great an affinity for moisture has it, it is next to impossible to make it in damp weather. The manager of the Fox Hill Golf Club, at Stapleton, Staten Island, states that he "made two applications of Bonora to 'greens' which had been killed off by frost, and got them in perfect shape for the metropolitan championship in the middle of May, and that they withstood the summer heat, and came out of the following winter, in first class shape."

Being instantly soluble, Bonora is immediately available. It creates a vigorous root action, and thus makes a strong, healthy plant, able to carry its greatly increased load of bloom or fruit. That it does greatly increase crops, both as to quantity and quality, is testified to by Mr. Jacob H. Schiff's gardener at Sea Bright, N. J., who has used it on palms, primulas and glorianas; he reports that "the first are 70 per cent and the last two 50 per cent improved; that the palms have a beautiful green foliage, and that the primulas and glorianas grow larger flowers, and hold them longer."

That it causes plants to mature with great rapidity is shown by the experiment of a prominent United States official, who tried it on melons and tomatoes; although he had been three weeks behind his neighbors in planting these, he had them on his table three days ahead of them. Samuel T. Peters's gardener at Islip, Long Island, too, tested it on cauliflowers under glass, one-half only of the bed, however, being treated with Bonora, and the remainder with the other fertilizers; the Bonora fertilized cauliflowers were headed up and marketed two weeks earlier than the first.

The Hon. Cornelius Bliss's gardener at Oceanic, N. J., has carried off prizes with ferns, chrysanthemums and lettuce that owed their triumph to Bonora. He is quite enthusiastic, and says: "I have been using Bonora for the last two years, and the longer I use it and the better I become acquainted with it the more I like it. I grow my vegetables under glass with this fertilizer with splendid results." Indeed, its effect upon house plants is said by those who have experimented with it to be little short of marvelous. Mrs. T. P. Shepard, of Providence, for example, reports that she "used it on various greenhouse and stove plants and found the results very pleasing; its effect on palms was really wonderful, giving them an appearance I had not been able to produce with other fertilizers."

Although this plant "elixir of life" has been introduced only about a year and a half, its use has become widely distributed. It is in use at Frederick W. Vanderbilt's country seat at Hyde Park-on-the-Hudson; by the Pennsylvania Railroad; on the Eden Trial Grounds at North Middleboro, Mass.; in the Capitol grounds, at Washington; in city parks; in palatial houses here, and, in fact, in wherever horticultural intelligence goes hand in hand with the love of plants and flowers, and wherever agriculture has learned the value of scientific, intensive farming.

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YOSEMITE—A GREAT PANORAM OF VALLEY AND GRANITE WALLS.
El Capitan, Half Dome, The Three Graces and Bridal Veil Falls before you.

HAPPY ISLES.
The waters of the Merced are separated by two densely wooded islands.

Life is an unfoldment, and the further we travel the more truth we can comprehend. To understand the things that are at our door is the best preparation for understanding those that lie beyond.—Hypatia.

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I NOVEMBER, 1908 No. 8

THE OUTDOOR WORLD

Vacation Days in Yosemite's Wonderland

BY MISS M. FLORENCE HAY, LOS ANGELES, CALIFORNIA.



HEN the winter snows falling and drifting over mountain bluff and valley mysteriously robe the great Yosemite in its winter garb of frost and ice and frozen waterfalls few visitors are there, but when the early spring sun melting the accumulated snow again given more active life to the icy falls with their fairy fretwork of frost and hanging icicles the "maddening crowd" begins its yearly pilgrimage to this marvelous valley.

By June the snows have all receded to the higher peaks and plateaus, the ice cones are gone, the trees have again shaken their mantles of frost and snow and the valley sings of spring and birds and running water. The wild, wonderful winter with its few loving visitors has passed. Tourists begin to come.

Hitherto many were deterred from taking this trip but now the long, arduous, winding journey over interminable, hot, dusty foothill stage roads and rough, winding mountain grades has been done away with. A short, direct route places this wonderland of magnificent scenery within easy reach. The new Yosemite Valley Railroad takes you up to the very edge of the park line at El Portal, leaving only a little over fourteen miles of delightful staging to place you in the heart of the valley. At Merced you leave the Southern Pacific and monotonous stretches of the great San Joaquin Valley. Here the new line trends eastward through one of the most picturesque canon roads in the world. The yellow plains are soon left behind. At first the road winds in and out among the still rolling hills, but before long you commence to climb more perceptibly. The

Copyright 1908 by The Agassiz Association, Stamford, Conn.

dry and bare hills give place to more rugged ones covered with scrubby trees and low chaparral. Then comes the wonderful Merced River Canon with its wild and picturesque scenery. Here for miles you follow in the wake of the turbulent, crystal waters, skirting the very edges of the rugged, boulder strewn banks which hem in their surging course. You cross and recross their foaming cascades and wind steadily upward through the old historic mining district until you reach El Portal, the terminus of the road. The remainder of your journey is taken by stage, which gives you a brief and charming taste of staging in the Sierras.

You follow the winding and rising mountain road to meet newer and greater wonders beautiful beyond description, though rare spirits like Muir have given picture writings that carry you into Nature's realm. Always following your magical river, the valley becomes deeper and wider; the cliffs rise above you; there are cracks and crevices that seem nests for multicolored shadows, and above clouds white against the blue.

To your right looms up Elephant Rock which, though minus his trunk, towers ponderously above you, while a little farther on to your left stands El Capitan, "The Great Chieftain of the Valley," straight and erect, presenting his glistening and perpendicular walls of solid granite to your wondering gaze and at his great height of three thousand and twelve feet he looks across to Bridal Veil Falls leaping, breaking, falling and finally misting upward again with innumerable iridescent rainbows caught in her spray. This is Pohono, "Spirit of the Evil Wind," bewitching and luring the beautiful Indian maiden to her doom. Even to this day the Indians avoid this mystic fall.

Now you pause at Artist's Point, the most magical and entrancing of view



MIRROR LAKE, YOSEMITE.
A beautiful natural mirror.

points. A great panorama of valley and granite walls spreads out before you—the flowing Merced, the green meadows, the road lost in the tangle of trees, the bluffs of stone and in the far distance Half Dome, high and grey and imposing, seemingly a closed door to the long deep valley. You drive on only to find beyond the turn Cathedral Rock and Spires, whose wonderful glacier-marked turrets indeed suggest a giant temple whose wonderful power of catching lights and shadows and changing them to the most delicate tints of violet and amber cannot be rivaled. Then you pass the Sentinel, truly called "The Watch Tower of the Valley," while across The Three Brothers look back threateningly from their lofty elevation of three thousand eight hundred and thirty feet.

Then at a sudden turn in the road the beautiful Yosemite Falls burst upon your view. The narrow, surging fall, widening in its descent, drops only to be caught in a wide crevice, bursts forth again in a shorter leap upon a lake-like ledge of rock and then plunges down its last three hundred feet in a broken crystal torrent of falls and a rising, shimmering billow of mist. Yosemite without the mystic charm of moving waters? No; the silence of the deep valley calls for the song of the crystal streams and falls.

But now your driver passes Camp Ahwahnee and the Valley Hotel and with a flourish and snap of his long black whip swings his stage and four into place before the white tents of Camp Yosemite. The journey is over at last and you are ready for the wonder of the walks and trails.

From the meadows below the camp the Merced twists and curves and disappears in the deep chaparral. Then for the first time you really feel how the massive battlements of stone wall up the valley and far above you sharply cut their silhouettes against the blue of the sky. Walled in! Nothing spoils the irregular line or the broken sweep of the opposite wall and the eye never tires of following the ragged outline or measuring the steep and perpendicular heights. But from this stony fortress are avenues of escape, onward and upward, and a wall that seems part of your great fortress height is on nearer approach, the opposite wall



GLACIER POINT.
Height, 3,254 feet.
From here the whole valley spreads out at your feet, wonderful, awe inspiring.

of a smaller valley. To your left you may follow a trail through Tenaya Canon, or to your right, past Happy Isles and



YOSEMITE FALLS.
Entire height 2,600 feet.
Here is found the mystic charm of moving waters.

Vernal and Nevada Falls, you may enter the Little Yosemite.

Directly opposite your camp stands Glacier Point, a summit of bare, upright faces of rock rising three thousand two hundred and fifty-four feet above you. A zigzag trail of four and a half miles will take you to the top. From here the whole valley spreads out at your feet, wonderful and awe inspiring. Across



NEVADA FALLS.
"The whole of the Merced River here plunges down six hundred and five feet with reverberating and mighty billows of mist and arching rainbows."

are the beautiful Yosemite Falls and Mirror Lake, back is the wonderful valley; beyond are the wonders of Vernal and Nevada Falls, Half Dome, North Dome, Cloud's Rest and the irregular outline of snow capped mountains growing higher and fainter until the eye tires with striving to see what the dim distance hides.

You return once more to the valley, and if you turn up Tenaya Canon soon Mirror Lake breaks upon your view, only a still pool where the river widens and then glides on around the base of Half Dome and joins its waters with those of the Merced. This little glacier basin of still water is so surrounded by high granite walls that not a breath stirs its polished surface and even in the summer months the wonderful sunrise reflected in the depths of the lake does not come until nearly eight in the morning. The trees and dome with their delicate morning tints of violet, amber and changing greens are here perfectly mirrored far below us.

But if you follow the Merced and enter the Little Yosemite a series of magnificent views are awaiting you. Just before you leave the floor of the valley the waters of the Merced are separated by two densely wooded islands. These are the Happy Isles. Here at the meeting of the foaming waters these islands invite you to their alluring shade and many an hour may drift away before you recross the natural tree bridge and begin the climb to the higher falls.

When you have gone some five miles from camp and are crossing a little rustic bridge over the Merced one of the most beautiful of all the falls, rightly named Pi-wa-ack, the "Cataract of Diamonds," breaks upon your view. These are Vernal Falls and the wonderful, foaming volume of plunging water reminds you of Niagara and although it is smaller than that of the eastern wonder yet it falls nearly twice as far and in its leap of three hundred and fifty feet below its sheet of surging water is shattered into millions of brilliants and into billows of white, foaming spray. A mile farther on you come to the last of the large water falls of the Merced. As Dr. Peck says, "The whole of the Merced River here plunges down six hundred and five feet with reverberating and mighty billows of mist and arching rainbows."



CATHEDRAL ROCK AND SPIRES.

Their wonderful power of catching lights and shadows and changing them to the most delicate tints of violet and amber cannot be rivaled.

It is with regret that you turn away and wind up the "zigzags" at the left but there are still wonders beyond. Here the Little Yosemite commences and Cloud's Rest is but six miles off. For a short distance you still follow the Merced and then turn to the north and make your last, long, steep climb and Cloud's Rest is reached. The atmosphere is keener and colder; below you and around you is melting snow. To the east Mount Lyell stands boldly with his snow-white glacier clinging to his dark, steep side. Here the newborn Merced finds its source as a trickling glacier stream which widens and grows and then out of treeless slopes, hidden canons and broken rocks emerges a sharply cut, surging mountain river. To the west is the San Joaquin Valley with its dim yellow patches of heat, beyond the scarcely visible, blue outline of the Coast Range Mountains and nearer, below you, are stretches of emerald green meadows, life-giving spots in this wonderful snow-tipped mountain wilderness. Here, too, in the sparkling air the birds sharply cut their black outlines against the sky and at your feet in crevices of rocks blooms the delicate pink Sierra primrose in its setting of green.

Here, ten thousand feet above the sea, even Half Dome and Glacier Point seem far below you. From this high altitude you get an inspiration to explore all your eyes fall upon and you delay your return. To all the charms of mountain climbing you add the delight and satisfaction of taking time to see some of Nature's grandest handiwork Small wonder that you linger long after your companions have gone! You follow spring up to the highest Alpine meadows and journey leisurely back to the floor of the valley along some hidden trail to fall under the charm of Indian summer which will hold you in its spell until winter once more comes with its host of followers and holds sway over his mighty Yosemite stronghold.



EVERY CURVE IN THE ROAD IS AN INTERROGATION POINT TO THE NATURALIST.

Photographed by J. R. Campbell.

INTERESTING SUGGESTIONS AS TO GALLS.

BY FREDERICK SCHWANKOVSKY JR.,
DETROIT, MICH.

Late in autumn if you examine the stems of the golden rod, you will notice here and there a stem bearing a huge globular swelling as big often as a fair sized plum. This is a gall and if you cut one open you will find in the centre of it the home of a small grub. "Question: How did it get there and why the swelling?

The egg hatches and the larva eats into the stem. Meantime it excretes a poison which caused the abnormal growth called a gall. Each different kind of gall insect uses a particular plant apparently and, if the galls are placed in bottles not tightly closed the flies or gnats will emerge toward spring.

I went further in my investigations than merely letting the insects peacefully emerge. I cut a gall of each sort open from time to time and noted what change had taken place. In the



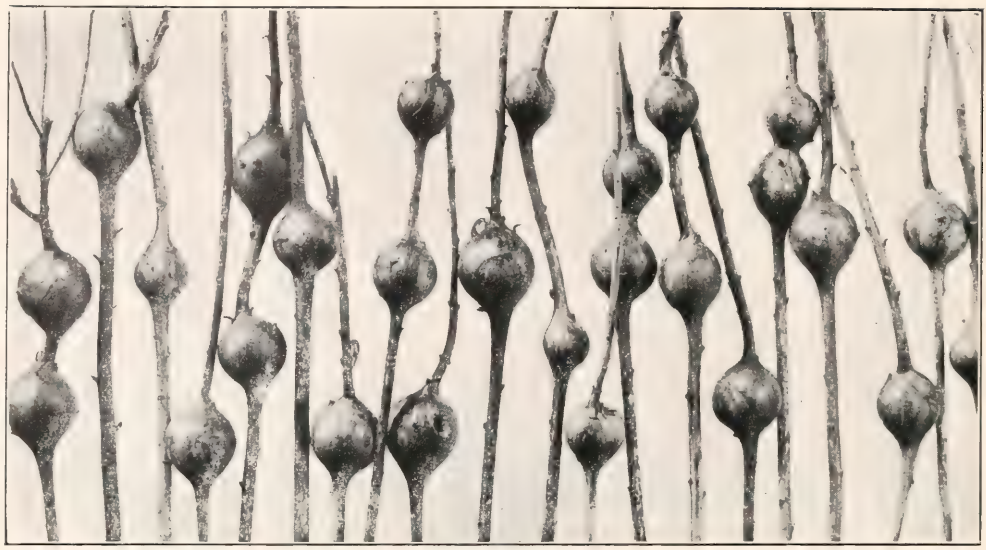
A VARIETY OF COMMON GALLS.

A, galls on an oak twig; B, mossy gall on a brier rose; C, bud galls (pine cone galls) from willow; D, a peculiar gall found on a brier rose; E, globulous galls from oak twig; F, wild blackberry galls; G, golden-rod galls.

Last fall I became much interested in galls and when I rode the old horse out through the woods I used to have an eye out constantly for them. I collected a number of varieties, from the golden rod first and afterward from raspberry bushes, from oak trees and willows and from the wild briar rose.

On investigation I found that the gall is formed by the larva of gall flies or gall gnats. The adult places the egg, by means of her long sting like ovipositor in the green tissue of the growing plant.

case of the golden rod gall called Trypeta Solidaginis of the muscid family, and therefore a relation of the darling little house fly, the larva is first found small and naked, it then increases in size. Next it pupates, that is its outer skin dries hard and the grub lies dormant within it. If a pupa is opened the grub is found assuming the form of a fly with little fleshy wings and all of the grub color. Later still it turns dark and finally breaks the dry skin and works its way out of the gall and after crawling



A DECORATION OF GOLDEN-ROD GALLS.

rather weakly about for a time, takes its first awkward flight. It is a pretty brown fly in shape similar to the house fly but with mottled wings. I had never seen one until I hatched the first one out.

The rose, raspberry and oak gall flies are more like minute wasps and in the case of the rose and raspberry galls which are covered with a mossy growth a number of flies hatch from each gall. These are all Hymenopterous or four winged while Solidaginis is Dipterous or two winged, and they do not pupate. I therefore worked a little scheme to observe them. I sliced a gall carefully exposing several little chambers each with its grub and glued over all a thin microscopical cover glass so that the development was easily watched. It was most interesting to see those little grubs become little wasps; to see the eyes show up black, then the head, then to see the wings form and finally to let the tiny insect out into a covered lamp chimney and feed it with sugar solution. After they are out a few hours they show rapid changes in the matter of growth and the loss in the abdomen of the grubby, squirmy look. The ovipositor marks the females and is like a little hair sticking out behind, very "sting" looking. These little insects have graceful antennae which are very motile and altogether they are pert, fit looking little fellows.

On the willows of certain varieties, winter finds certain swollen dry buds very like pine cones in appearance and from these hatch a gall gnat, a dipterous insect again, but very small with long narrow wings, more like a mosquito.

This is no effort to describe all the galls I have collected but I suggest that the study of galls is exceedingly interesting and very easy and they should be collected between now and early spring. I have placed in my collection the gall and beside it the gall insect of each kind I have found and consider them one of my most interesting exhibits. They can be arranged in "Riker" mounts too, as I have *Solidaginis* with a normal gall, an opened gall, showing pupa, and undeveloped fly, and an imago or adult.

Be careful to kill or remove inmate of exhibition galls before mounting or you will keep discovering lively little uninvited additions to your collection, as I did.

POPULAR ASTRONOMY

THE HEAVENS IN NOVEMBER.

BY GARRETT P. SERVISS, BROOKLYN, N. Y.

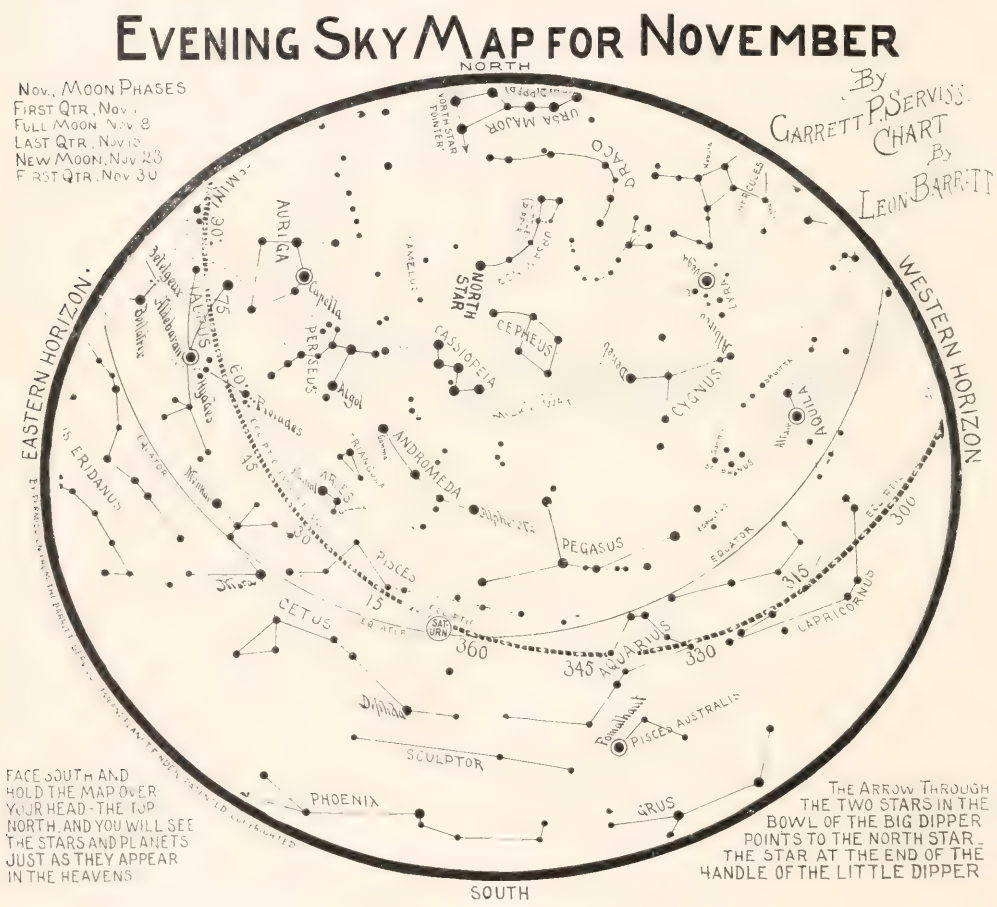
Saturn is the reigning planet in the evening sky for November this year. He is well situated for observation, being near the meridian at 9 o'clock in the middle of the month. He is in the constellation Pisces, not far from the vernal equinoctial point, and consequently close to the equator and the ecliptic at the same time. The minor axis of the rings is somewhat shorter than in September and October, and consequently they appear less widely opened. They present, however, a very beautiful spectacle in the telescope. It is the southern side of the rings which is now visible, and it is upon this side that the sun will continue to shine until 1922, when the rings will again be edgewise toward the ends, and after that their northern surface will cave into the sunshine, as well as into visibility from the earth. At present the apparent minor axis of the rings is less than one tenth of the major axis, but this will open wider and wider, year after year, until in 1915 the minor axis will be half as great as the major axis, and the outer border of the rings will be seen hiding the north pole of the planet at one side, and projecting outward from behind the south pole on the other side. No greater pleasure could be recommended to an amateur astronomer, possessed of a three or four-inch telescope than that of watching the gradual opening of Saturn's rings, at every opportunity, during the next few years. As they open wider the "crape" ring, the innermost of the set, becomes more clearly visible where it crosses the planet like a shadowy band.

Uranus and Neptune are also evening stars, the former setting and the latter rising at about the hours for which the chart is drawn—9 P. M. November 1st; 7 P. M. November 30th the other planets, Venus, Mercury, Mars and Jupiter are all in the morning sky, strung out in a row from the constellation Leo into Virgo. Jupiter is in the eastern end of Leo, and rises about 2 A. M. on November 1st, and about midnight on November 30th. Venus comes next, in Virgo, rising between 4 and 5 A. M. on the 1st. Then follows Mars a half hour later, near the bright star Spica. Mars and Venus will be in conjunction on the 30th. Mercury, the swift-footed, advancing westward from its conjunction with the sun on Oct. 27th, will reach its greatest western elongation on the 13th, when it will rise before 6 A. M., in the eastern part of Virgo.

The Stars and Constellations.

The great attraction of the stellar heavens in November is found by the remarkable group of northern constellations called the "Royal Family," including Cassiopeia, the Queen, Cepheus, the King, Andromeda, the Princess, and Perseus, the Rescuer, who, according to the ancient myth, saved Andromeda from the sea monster, when her family, by the orders of the jealous sea nymphs, had chained her on a rock on the sea coast to become the prey of the monster. This monster has sometimes been identified with the huge whale Cetus, which is seen occupying nearly all the southeastern quarter of the sky. Andromeda is recognizable by a row of three second magnitude stars, the westernmost of which is identical with the northeastern star in the East Square of Pegasus, which bears the name of Alpheratz. This marks the head of the chained princess. The position of her feet is indicated by the star Gamma, the easternmost of the row. Cassiopeia, "heaven-troubled queen," is placed between Andromeda and the pole, and is always easily recognized by the five stars forming the out-

line of an irregular letter W. Northwest of Cassiopeia is the king, Cepheus, whose constellation is rather inconspicuous. In our chart five of its principal stars are shown. Perseus appears east of Andromeda and Cassiopeia in the midst of the Milky Way. His stars form a bending bow, with a bright star in the center. Below Perseus hangs the little group called Medusa's Head, containing its mysterious dark comrade is considerably more than three-quarters of a million miles in diameter. They are only about three and a quarter million miles apart, measured from center to center. There will be an eclipse of Algol about half after 8 o'clock P. M. on Nov. 15th. The star Gamma, Andromeda, already mentioned, is a very beautiful double (triple with very powerful telescope).



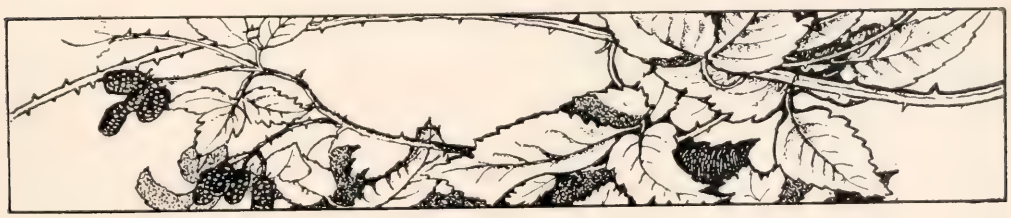
the wonderful variable Algol, which runs through an astonishing series of changes in brightness in a regularly recurring period of two days, twenty hours and forty-nine minutes. These changes are believed to be due to partial eclipses produced by a huge dark body working around Algol at close quarters. Algol, it has been calculated, considerably exceeds the sun in size, having a diameter of about a million miles, while South of Gamma is seen the little constellation of Aries, the leader of the Zodiacal twelve, and south of that again is the constellation Pisces, the no less wonderful variable Mira. This differs entirely from Algol in its variability, its period of change occupying about eleven months. When brightest it is sometimes brilliant, exceeding the second magnitude, while, when faintest, it is far beyond the range of the naked eye, sink-

ing to the ninth magnitude. Irregularities in its period render predictions of its maxima somewhat uncertain. It should have been at a maximum about the middle of October, and in November should be seen declining in brilliance. The middle of the eastern sky is rendered glorious by the advance of Taurus and Auriga, closely followed by Orion and Gemini. The Pleiades in Taurus are well up in the sky at the hours represented by the chart. The two first magnitude stars, Aldebaran in Taurus, the gem of the V-shaped cluster called the Hyades, and Capella, further north, in Auriga, form a good counterpart in the eastern heavens to Vega in Lyra and Altair in Aguila, which, at the same hour, are seen declining in the west. Far down in the southwest glitters the lone brilliant Fomalhaut in the Southern Fish. The Great Dipper is under the pole, skimming the horizon in the north.

November has long been famous for its meteors. The celebrated Leonid meteors, thus called because they radiate from the constellation Leo, made their most recorded brilliant display on the night of Nov. 13th, 1833. In 1866 and 1867 they were again abundant about Nov. 14th, but when looked for in November, 1899, their next calculated period of maximum they were conspicuous by absence. Calculations showed that the great meteoric swarm had been drawn wide from its orbit by the attraction of the planets Jupiter and Saturn, and they will never be seen again in similar numbers, resembling a "mountain of fire." But every year from the 14th to the 16th of November more or less of these meteors are to be seen. Their radiant point in Leo does not rise until about midnight, so that they can best be seen in the early morning hours. Those visible in the evening will be seen rising from the eastern horizon. Recent studies have shown that meteors of different swarms are characterized by peculiarities of movement and sometimes of color. The Leonids are remarkable for their swiftness. The small ones resemble streaks drawn quickly across the background of the sky. The moon, which is at Last Quarter on Nov. 15th, will not much interfere by its light with the visibility of these meteors. Those who watch them should note carefully their paths, and count the number seen in a given time. From the 17th to the 23rd of November the Andromeda meteors are seen, thus named because they radiate from the constellation Andromeda. Some of these have been supposed to be fragments of the lost comet of Biela. They made brilliant displays in 1872, 1885, and 1893. These meteors are characterized by their relatively slow motion, and by the fiery trains that they leave behind them. The moon will be entirely out of the way on Nov. 23, so that, as far as its light is concerned, the opportunity will be good for seeing the Andromeda meteors. They can be observed early in the evening since Andromeda rises before sunset.

GLORIFYING THE COMMON PLACE.

But it is only the great poet who has the courage and power so to see things. It is only a Homer or a Whitman who will pass by the pomp and circumstance of life to glorify some mean and "vulgar" thing,—as the parting sun will sometimes turn and speed over the shoulder of the world an arrow dipped in gold to set ablaze the windows of some mountain cottage, or burn a needle's eye through the slender village spire, leaving the casements of the proud palaces in the plain all blank and undistinguished.—Kennedy in "Walt Whitman."



THE CAMERA

WHITE SWAN.

BY GEO. W. KELLOGG, 42 BUENA PLACE, ROCHESTER, N. Y.

This is an illustration of early morning possibilities, with a camera, about the feeding grounds of domesticated waterfowl. Voluntarily they will come near, often too near, apparently anticipating a breakfast concealed within the picture machine. At no other time has so much sociability been manifested or the white swan seemed so agitated, apparently disappointed because of an anticipated morsel which has not been contributed.



KODAK VIEW OF SWAN.

PHOTOGRAPHIC STUDIES OF THE RED-EYED VIREO.

BY PAUL G. HOWES, THE MAPLEWOOD FARM, STAMFORD, CONN.

Of all our vireos no other is so widely distributed as this modestly colored little songster, who makes his home in our shade trees, or in our orchards. He sings incessantly from early morning until sunset and at times he is almost monotonous to those who do not have a natural love for our birds. His clear and almost liquid "Viry,"..."Vireo" may be heard at times during the day when no other bird voice breaks the monotony of the "Zeeeeeee" of the countless numbers of cicadas. He also continues his song late into the fall when most other birds have long since stopped. One can almost believe that he is telling you something, then stops as if thinking it over for a few seconds and finally ends by asking you, "Is it not so," "You believe me?" "Surely it is."

There has been some discussion about the color of the eye of this bird, some saying it is not red but brown, others saying it is not brown but red, however in the many birds which I have come in contact with the eye has been neither, or you might say both, it being a mixture of the two but, if anything more red than brown.

The birds arrive from the south during the second week in May, but do not commence building their nest until the latter part of that month or the first or second week in June. It requires from



THE FEMALE VIREO PLACING FOOD IN THROAT OF A NESTLING.

five to seven days to complete the nest; built of coarse needles on the exterior, and lined with finer bark or pine needles on the interior. The outside of the nest is also ornamented with small pieces of lichen which are fastened on with cobwebs. The nest is always placed in a crotch where the limb splits and is very tightly woven into the Y of the limb. The nests vary in height from thirty-six inches to forty feet above the ground and are always pensile. It is most always at the very tip of the branch woven into the endmost crotch. The tree chosen for the nest is of any kind, but there seems to be a slight preference for maple. The full number of eggs usually laid is four, they are pure white with a few specks of blackish brown mostly around the largest end.

An egg of the Cowbird (*Molothrus ater*) may often be found in the nest. I once found a nest containing three eggs of the cowbird and none of the vireo. In such a case it should be made a point to destroy one or more of the eggs, for if all three cowbird's eggs should hatch the vireos would have such a hard time finding enough food for them, that they would not have time to obtain enough nourishment for themselves and so would likely die of hunger, so devoted are they to their young.

It was just after returning from a visit to Long Island in the latter part of June, 1908, that my brother informed me of a Red-eyed Vireo's nest that he had found just previous to my return. The trusting birds had chosen a white ash tree on our lawn and had built their nest but three feet from the ground.

Here was a chance for a study of bird parentry not to be found every day, and the following afternoon (June 21) found me at work. About two o'clock that afternoon after having watched the brooding female for a half an hour, she suddenly became uneasy and kept moving about in the nest, then settled down again, in another minute she hopped out of the nest paused on the brim for a second, then flew in a straight line through the shrubbery and out of sight.

At this point I ventured over to the swinging cradle and on looking in found



NEST AND EGGS OF THE RED-EYED VIREO.

that the first little nestling had just split the wall of his prison. After looking at it for a minute I backed off and had not gone far when the female bird returned accompanied by the male. They both alighted on the edge of the nest and anxiously watched their naked and helpless baby. Occasionally one of the old birds would pick off a small piece of shell to aid the young bird in hatching.

The nestling was almost naked excepting for a streak of yellowish down which at first I had not noticed. The beak had a yellow rim and the throat was also of a yellowish hue.

Immediately after the young bird hatched the old bird started feeding it with small green worms. Now was my chance to set up my camera and commence getting the old birds used to my



"They would always eye every nestling carefully before feeding.

During the hottest part of the day the female Vireo would sometimes come to the nest to shade the young from the sun.

being near to their nest. This was not long as the birds were very trusting and soon became quite tame. After setting up my camera I attached a short line to the button on the camera then sat down under a nearby beech tree and awaited results. In about eighteen minutes the female bird returned with a small green worm, eyed her nestling for a few seconds then stuffed it down the young bird's throat and was gone. This time to return in ten minutes, and after feeding the young bird, watched it closely 'till the food disappeared down its throat then hopped into the nest and commenced to brood. Here I left them for the day as they were getting rather nervous at the click of the shutter and my moving back and forth to change the plate-holders.

On the morning of the twenty-second the nest contained another nestling and on the morning of the twenty-third, another. I took no more photographs on these two days, but on the afternoon of the twenty-fourth I snapped a beautiful one of the female as she alighted at the nest to shade the young from the sun, and another as she placed food in the throat of a nestling.

Between the visits of the parent bird the young ones would hang their heads over the edge of the nest and in a few seconds would go fast asleep until the wind jarred the branch which held the nest or some bird would call near to the nest, then up would go all three heads, each straining to its uttermost in hopes of being first fed but only to be fooled and drop back into the nest to continue their sleep.

It was not until now that the male bird who had been continually singing on the previous days in the top of his nesting tree, commenced to help his mate in the task of feeding the young who had now grown considerably, they being three days old, commencing to feather out and with ravenous appetites. From this date I took no more photographs until the afternoon of June 27, when I was lucky in getting a portrait of both birds, the male feeding the young with a large moth, and the female standing on the edge of the nest with a long slender worm waiting for the male to finish.

When the birds would come to the nest they would always light in the center of the nesting tree and from there work their way to the nest in a zig zag course. When leaving the nest they would always hop to a certain nearby



"Then up would go all three heads each straining to its uttermost."

Both the Vireos at the nest.

branch then, after cleaning their beak, would fly in a straight line from it.

It was of much interest to watch the methods employed by the old birds in cleaning the nest. As soon as an excrement appeared in the nest it would be removed by the next bird which came to the nest. After feeding the young the parent would pick up the excrement and fly some distance with it before dislodging it from its mandibles. If there was more than one excrement in the nest the old bird would calmly swallow one and fly off with the other.

By July second the young birds commenced to show signs of dissatisfaction when I approached the nest. On the morning of the third, one jumped out of the nest and, although I replaced it time and again, once it had tasted nature's freedom the old home had attraction no more for the restless young vireo. Next morning, July 4, another was gone. This one was soon followed on the morning of the fifth by the last one of the brood. Here ended my happy two weeks with the vireos and as I almost daily pass the old and dilapidated nest, pleasant recollections never fail to enter my mind.

STUDIES OF THE GREY SQUIRRELS.

BY JOHN S. FERNALD, BELFAST, ME.

Several of the cities and villages of Maine have colonies of what may be termed semi-domesticated pets, the grey squirrels of the near-by wood-lots having moved in and made themselves homes among the trees of the streets. In the summer of 1902 such a colony emigrated to Belfast, and the descendants of the original families still abide in peace and contentment. The people generally received them kindly from the first, and even the mischievous small boy soon changed from throwing stones and shooting with air guns to carrying supplies of peanuts and acorns for feeding the little visitors. The squirrels soon became very tame and would run to and climb upon the clothing of any person showing a friendly disposition. At many houses the squirrels became daily visitors, often going into the various rooms in search of their human friends.

But cats and dogs have not yet learned to regard the squirrels as other than their legitimate prey, and in avoiding the attacks of these enemies the little fellows often show remarkable traits. The first pair that came to my house were soon marked by the cats of the neighborhood, and when the usual hour for their morning visit arrived the place was blockaded by a cordon of felines. One morning my squirrel visitors failed to appear, but the next day, as I was working at my desk, they both came in through the dining room, which was located just in the rear of my study. They had run the blockade of cats in front of the



KODAK STUDIES OF GREY SQUIRRELS.

house by going around the buildings, through a back street and the garden, and coming in through the open window of the dining room. They kept this up until the cats became tired of waiting and raised the blockade.

Among the cats were two to which my attention was especially directed by the difference in behavior of the squirrels towards them. These cats were known as Fluff and Frank. Fluff was a large, fat Angora, slow and clumsy, but with a vigorous appetite for squirrel meat. Frank was short-haired, lean and active, and with an equally vigorous longing for squirrels. It was a common sight for a grey squirrel to be digging for buried nuts within a few feet of Fluff, and when she would make a jump for him, he sprang nimbly to the nearest tree or fence post, from which he read her the riot act by a savage chattering and quick snapping of his bushy tail. But let Frank appear in sight, and while he was yet a long way off every squirrel in the vicinity would hie himself forthwith to the tallest tree available, and onto the small branches that would not bear the weight of a cat.

That they recognize their friends they show in many ways. I once went out with a horse-whip to drive away a dog that was chasing squirrels, and had one "treed" in a small shrub in the yard. Although every blow I struck at the dog swished close to the little fugitive he seemed to realize that no harm was intended for him, and kept quiet until the dog was driven away, when he came down and ran up on my shoulder. But after a dog drives a cat away from a squirrel the little chap shows no such confidence in his protector, but still gives him a wide berth.

But squirrels seldom fall victims to either cats or dogs, their quickness and ability to run up trees and out upon branches where cats cannot follow proving their safety. In fact I never saw but two squirrels killed by other animals. One became stalled in deep snow, and the other fell while jumping from one tree to another, and alighted between two dogs.

But the skill with which they avoid the camera is a puzzle to the amateurs. While it is comparatively easy to get a photo of a squirrel at long range, he will depart in a most lively manner if he sees a camera pointed at him at close quarters. A squirrel will sit on the window sill at my elbow and eat nuts from my side pocket as I operate a typewriter, but if some one tries to point a camera at him the place which knew him knows him no more that day.

THE SMUGGLER'S CAVE.

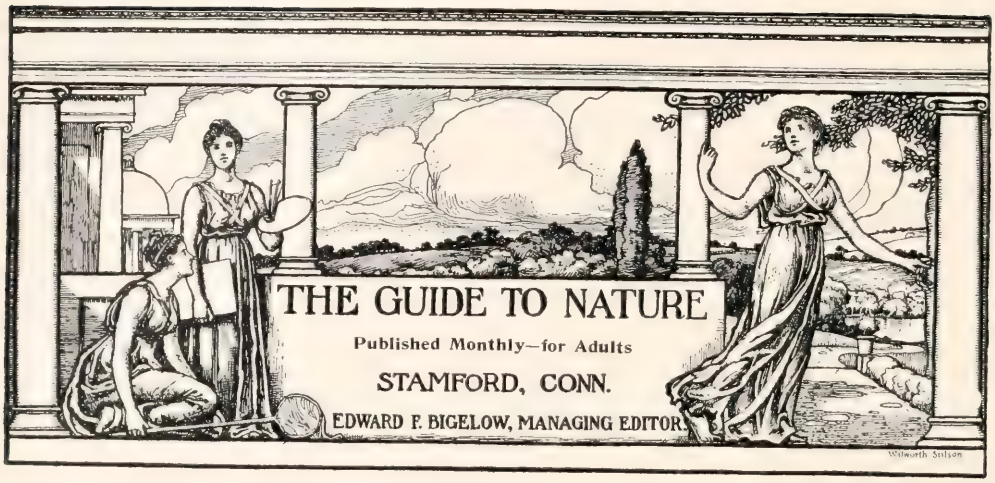
BY L. J. GILLELAND, AYTON, ONTARIO.

The photograph of "The Smuggler's Cave" was taken in the Gagheto Islands. Between the years 1843 and 1850 these islands were all activity owing to the enormous quantities of fish taken from the waters around the islands. Whiskey



LOOKING OUT FROM THE SMUGGLER'S CAVE.

was smuggled in to sell to the Indians and whites engaged in the fisheries. The liquor was hidden in fissures and cave-like openings in the rocks caused by the action of the waves. As the water receded, some of the "caves" were left quite dry. The picture is a view looking outward from one.



THE CORRELATION OF INTEREST AND OBSERVATION.

I have somewhere read of a lady who on calling at the studio of a famous painter (Turner, I think) thought to criticise a great painting of a sunset on which the master was at work.

She said, somewhat superciliously, "I never see all those colors in nature."

The reply was, "No, madam, you don't; but don't you wish you could?

To those who are not naturalists, it seems strange that we, who are, can become enthusiastic over "commonplace nature with uncommon interest" and revel in it.

John Burroughs, in The "Century Magazine," writes as follows of this art of seeing things:

"I once spent a summer day at the mountain home of a well-known literary woman and editor. She lamented the absence of birds about her house. I named a half-dozen or more I had heard or seen in her trees within an hour--the indigo-bird, the purple finch, the yellow bird, the veery thrush, the red-eyed vireo, the song sparrow, etc.

"'Do you mean to say you have seen or heard all these birds while sitting here on my porch?' She inquired.

"'I really have,' I said.

"'I do not see them or hear them,' she replied, 'and yet I want to very much.'

"'No,' said I; 'you only *want to want to* see and hear them.'

"You must have the bird in your heart before you can find it in the bush."

Every naturalist, I suppose, has frequently impressed upon him how many interests in this world go to waste with most people. Strange, isn't it, how many trivial and artificial things gain supremacy in popularity? With what feeling of pity or of kindly toleration the great mass of mankind looks at the pursuits of real students and lovers of nature! They seem to regard such things as a species of harmless lunacy.

I once saw a sign hanging out over the street in front of a saloon. It bore this legend which was supposed to invite passers by to conviviality: "As we journey through life let us live by the way." How true but how much better applied to living in touch with nature than to carousal and debauch with one of nature's by-products.

Lack of interest causes most persons to miss many of the best things of this life, to fail of most satisfactory living by the way. To many this life is a dreary valley of Baca, of which the Psalmist said that he, passing through, was able to make it a well.

Recently one of my neighbors became interested in honeybees. Everything then centered in honeybees. When he took a walk it was to examine flowers and see what kinds the bees visited for nectar. Likewise to members of his family everything pertaining to bees had immediate attention.

In the latter part of October he called excitedly to say that all the bloom of the asters and the golden-rod on a certain

hillside was "covered" with a new kind of honeybee and "in all my life I never saw anything like them." He had caught in a bottle several of these "new species of bee." The same day one of his daughters who is a teacher brought home "a new honeybee" caught on a window pane in her schoolroom.

As our naturalist reader at once surmises, they had each caught specimens of the well known bee flies. It was difficult, however, to convince the man that they are not undescribed bees, will not sting and are very plentiful in some fourteen hundred varieties! He found it an interest and a pleasure to learn about their habits, structure, etc., and did so with all the delight of original discovery; he was a veritable Columbus in a new world where he had to "prod himself" to realize that it was not all a dream and that these things had existed all his life but that he had never before seen them.

Strange, isn't it, how many persons are blind to the interesting things in nature? It makes us feel guilty to think that we have so much of this world's goods, in wonder and interest, when so many fellow beings are self-doomed to go through the world with open eyes yet seeing not.

What a colony of institutions could be established for the mentally blind!

DO BLACKBIRDS DECEIVE THEMSELVES?

Recently while visiting at the home of Mr. H. E. Deats of Flemington, N. J., one of the AA members, my attention was called to the large number of blackbirds that roosted in the evergreen trees around the house. It was an interesting fact and a very noticeable one that when we went out in the evening with lanterns, or clapped our hands, the birds made a noise as if the entire flock had taken to flight. One felt that the trees were entirely filled with moving birds, but when we stood perfectly still they were noiseless, and we had the impression that they had flown to some other place. A little later in the year upon visiting at the home of Mr. F. P. Hills, Delaware, Ohio, the observation was repeated. Mr. Hill's house is in a nicely settled part and one of the finest residential sections of the town. For several years blackbirds in large numbers have persistently made their home in the trees near his residence. There are trees all along the street, on both sides, yet the blackbirds persist, in spite of all sorts of devices to frighten them away, in making their homes in these special trees. Mr. Hills told me that he had obtained a special permit to shoot them, had permitted boys to shoot them, had electricians string electric lights along the tree tops so that the trees could be instantly illumined. He had fired roman candles in large numbers into the branches, and yet in spite of all these hints, the unwelcome guests persist in remaining.

I repeated the experiment as made in New Jersey. A sudden noise such as clapping the hands, made such "a sound of a going in the tops of the trees" that it gave the impression that the entire flock had been frightened and had instantly departed for regions not known. But the facts of the case were that not a bird had left the tree; the sudden turning on of an electric light showed that every bird had simply stood upright on the limb and vigorously flapped its wings. Now what we want to know is: do these birds believe this sound to be a shield and a concealment? We are familiar with the story of the ostrich that, when fiercely pursued, thrusts its head into the sand and thus cannot see its pursuers, and so considers itself safe, and one can but wonder whether or not these blackbirds make these sounds in such intensity that they cannot hear the noise of the supposed enemy, and thus think that they have escaped, because they hear nothing but the rustling of their own movements.

There are many lessons to be drawn from the delusion of the ostrich or of these blackbirds, but these I leave to the reader.

Speaking of blackbirds reminds me of an incident that I must relate. For several years, a flock of blackbirds, in a manner similar to that detailed above, had made its home in two or three trees in the yard on one of the residential streets in Hartford, Connecticut. The resident on whose premises these birds were thought to tell me the story for publication. He sent a copy of "The

Hartford Courant" with two photographs that he had taken. These were forwarded in the evening mail, and I received them at 9.15 the next forenoon at my home in Stamford, Connecticut. While I was busy reading his story, members of my family said, "Come to the window and see the large number of blackbirds in our trees." The air was filled with a noise of their cackling and the rustling of the leaves. They stayed around our house that day and part of the next and then departed to regions unknown. It surely was a curious coincidence. I will not claim that they came along to verify the story of their existence! I must admit it gave me a curious mental emotion to see the flock just as I was reading about it. The next morning's mail brought a letter from the Hartford resident, stating that the previous evening the flock had gone off to the southeast. It was in all probability the same flock.

FROM TWO POINTS OF VIEW.

What a variety in every bit of natural scenery! As a child might sit with a kaleidoscope and turn it around and around tirelessly for an entire evening, accompanied with frequent exclamations of delight, so may the true nature lover, day after day and in unceasing delight, travel around and around any natural scene. I think that we naturalists often attempt too much. Linnaeus had the proper spirit when he said to a pupil as he laid his hand on a bit of moss, "Here is sufficient material for the study of a life-time." And he might well have added, "Admiration and entertainment for a lifetime."

It is not necessary to keep going forward to find ever changing scenes of beauty. If the beautiful scene under consideration will not turn, then get the different points of view by rotating yourself. One of my favorite haunts of nature near my own home bears thus turning-thirty-two points of the compass every day in the year. Herewith I show north and south points of view from the same center. They are distinct enough and different enough to be totally different scenes in two totally different places, and varied enough to necessitate



LOOKING SOUTH.



LOOKING NORTH.

no further travelling. Other views from the same center, if we had space to spare, would furnish an unlimited number of aspects—all of great interest and attractiveness. I wish I could photograph the region from at least eight points of view and focus all their beauty into one and make a sort of concentrated intensified, composite photograph. But perhaps that would be too much. Its beauty would be too great to be endured.

And yet the scene itself is equalled by many others, and as much variation may be found here at different times as in other similar places. And then to think that all these different localities have their different points of view in unending time in never repeating phases. But stop; the geometrical progression is too great. One's lifetime is not long enough.

We naturalists should feel guilty. Sometimes I do. We have accumulated more wealth than we merit. We would gladly distribute to others, if others were prepared to make good use of it. It would even be enough if others could be induced to realize that they have the wealth, and that it is a present.

But to return from the soliloquy for a moment. Sometime I shall photograph a "wheel" of beauty—perhaps one bank of the brook, perhaps the frog pond or the knoll, as a record of my journey through the changing scenes of the year, perhaps of two, or even three years.—there is no stopping.

Wouldn't you also like to go with the "compass wheel" in its wandering down the path of time?

You may. There is enough of this wealth, thanks to a generous nature, to "go around" and to give all a superfluity.



NATURE INTEREST OF A "BUSINESS" MAN.

BY E. EARL DUBOIS, OGDENSBURG, NEW YORK.

Dr. Bigelow has asked me to write a brief sketch telling "how I became interested in nature and why that interest continues."

The first of these questions I cannot answer because I cannot remember a time in my early life when I was not, in some way, interested in nature. I was born in that beautiful section of northern New York known to modern romance as the "North Country." My home was on a farm in a somewhat secluded spot about ten miles from the city of Ogdensburg, my present home. On one side one could see the cloud capped Adirondack Mountains whose forests, lakes and rivers are ever a delight and inspiration. On the other side, only a few miles away, was the Saint Lawrence River with its picturesque islands and rapids. On our own home farm were woods and creeks and ponds and everything a naturalist could wish. Not living near enough to a city or a village to have very much society and having my attention turned nature-ward, almost unconsciously, by observing parents, I could scarcely help becoming a nature student and forming in childhood a background for my life which will never disappear.



E. EARL DUBOIS.

Before I was very old I had named almost every plant which grew within several miles of my home and identified about one hundred species of wild birds. As soon as the extension work in nature study was started by Cornell University I became interested in it and have, ever since, received a great deal of benefit from the study of their publications and the personal aid and acquaintance of their force of teachers. Later on in school work these tendencies led me to specialize in botany and the physical sciences. The impressions of my early life thus became determining factors in my education.

The continuance of my interest in nature is a natural result of my view of life and that view, as I have just indicated, has been determined by environment and early training. There is one object or aim in life which I believe to be of supreme importance; that is, to put one's life in harmony with environment, with nature, and only by working toward this ideal can we get the most out of life and do our best work in any special field. To put his life in harmony with nature, a man must be familiar with natural things, must be a nature student and have a working knowledge of the forces that surround and control his life. In view of these facts, I believe that nature study is a practical thing, rather than an esthetic fad; a study for the masses, rather than for the few. When I was on my father's farm I found in nature study an aid to intelligent farming. When I was in school it deepened my interest in literature and natural science subjects. Later when I, somewhat reluctantly, took up a business career I feared I would lose my interest in nature but I have not. After spending three years in active business I have just as much interest in nature as I ever had and do a great deal of nature study work. These experiences lead me to believe that nature study is just as valuable to the practical man as to any other.

And yet I would not place too much emphasis on the practical side of nature study. In every sphere of life we often

come to knowledge through love. So many people, through the appreciation of beauty and a sense of the love and care of the Creator as it is manifested in nature, have been led to an intimate knowledge of nature and an abiding trust in the justice of her laws.

In this brief sketch I have given not mere facts about my work as a nature student, but have rather tried to give a few opinions on nature study which are the result of my own experience. I feel that my life has not only been made happier but that, in every way, I have been able to do better work because I have been and still am interested in nature. In closing, if there is any message I would have some other student take from these remarks, it is this: Go to nature, not only for pleasure and inspiration, but for knowledge that is of practical value in your life work. Engraft your life upon her all embracing strength and go out to meet your daily task with a new sense of power.

AN EFFICIENT NATURE CLUB.

BY CHAS. E. BARNES, BATTLE CREEK, MICH.

The Nature club of Battle Creek, Mich., which has had a continuous and successful existence for the past eight years, is a unique organization. Formed for the express purpose of nature study the members also give great encouragement to out door life and fresh air. During the winter meetings are held weekly, at which papers are read and talks given on various natural history subjects, followed by discussions. These meetings are very interesting and profitable. But just as soon as the snow is off the ground in the spring, then the outings of the club begin, and no more indoor gatherings are held. Spring, summer and fall are spent in the open. The members take no stock in "parlor naturalists." Field work and study from the great book of nature is their creed. So much has been published in the local papers about the outings of this club, that people generally in this city have caught the outing spirit, and hikes and pedestrial trips and cross-country walks have become popular with everybody. The club outings are taken part in by from a dozen to fifty members. These are very enjoyable, especially when a dinner is cooked over a camp fire in back woods style. The chef of the club is Mr. N. Y. Green, assistant cashier of the City bank, and a good cook he is. The country about Battle Creek is a paradise for nature lovers. There are within a radius of thirty miles about the city 435 lakes, besides the beautiful



CAMP SCENE OF BATTLE CREEK NATURE CLUB.

The big man on the right of the photograph is Mr. Charles E. Barnes, the president of the club, and the gentleman next to him is Mr. Green, the chef.

Kalamazoo river and many picturesque creeks. The accompanying photo is the camp scene of an outing on last Labor Day. At a near-by lake, by the side of a large spring of clear cold water, a camp fire was made and a dinner cooked for the entire party by Mr. Green. Beefsteak, corn, bacon and potatoes were cooked and excellent coffee made. With this menu were served the usual accessories brought to a picnic by the ladies. The dessert consisted of a big load of water and musk melons obtained at a nearby farm. The dinner was served to the ladies by the gentlemen, so that the former had nothing to do but to partake of the novel repast, and to enjoy it, which they did. Only those who have cooked over a camp fire in the woods know how good such a meal is, and how heartily it is relished. This outing is typical of those taken by the club, only no mention is made of the field work accompanying them.

CORRESPONDENCE AND INFORMATION

APPRECIATES NATURE

Apollo, Pa.

TO THE EDITOR:

"Devoted to commonplace Nature" attracted my attention to the first number I saw. That is what I think is needed. To attract the masses to an appreciation of common natural life. It is not necessary to know the botanical name of a flower to appreciate its beauty or enjoy its fragrance, nor to be schooled in the scientific classification of birds and butterflies to know their common names and enjoy their acquaintance. How gladly we welcome even a slight acquaintance in a strange city. Thus does one feel who meets a bird or butterfly and can say, "There goes a grosbeak, catbird or vireo, or a monarch, an admiral or an angle wing. In one of my daily routes while attending a fever patient in the country a distance of four miles, in less than two weeks' time I noted thirty species of birds. A farmer, an intelligent man, who saw me with a young cedar bird asked me if it was a native. He was surprised at my statement that I had seen a large flock on his farm. "Still," he said, "I know a blackbird, a crow or a robin and that's about all." All along the roads every summer we see the mangled remains of snakes, not venomous but useful ones. They are killed by the passerby as a matter of course. He gives no thought as to their harmlessness nor usefulness. The old Hebrew notion that the serpent is responsible for the sins of our race has much to do with the bruising of their heads even unto this day. Nine out of every ten persons would spare the white cabbage butterfly which causes the destruction of thousands of dollars' worth of cabbage every year, yet crush the life out of a salamander or a harmless snake which lives on vermin or worms and beetles. The economy of Nature would be better furthered if we interfered less with her laws.

Very truly yours,
T. J. HENRY, M. D.

A BEAR "ON A DRUNK."

Margaretville, N. J.

TO THE EDITOR:—

Farmers have considerable trouble during the autumn months with their cattle which devour large quantities of apples. These apples ferment in the stomachs of the cows and cause them to have all the appearances of being drunk. The animals will stagger from side to side, hang their heads and are unable to walk. Scarce a farmer in a section where apples grow in the pasture fields but has the experience some time during the fall of one or more of his cows becoming drunk on apples. The debauch of the

cows renders them useless for the remainder of the season. In fact, it often happens that they have to be fatted and killed for beef as their milk producing qualities are destroyed permanently.

I relate the above as the introduction to a remarkable bear capture that took place in this section not long ago.

Colonel Willard Kittle, who lives some distance back in the mountains, has the reputation of being the best bear hunter in the Catskills. Many a black fellow has fallen before the Colonel's gun or has been caught in his big traps during the past twenty years. He says that he thinks no more of killing a bear than most hunters do of bagging a porcupine or a woodchuck. He does not kill them for the sport but because he may secure some revenue from their pelts and from their meat, which he sells to his neighbors when they will buy it from him. The Colonel says there is nothing exciting in the ordinary capture of a bear, for the "Varmits are such a tormented nuisance."

But the veteran bear hunter had an experience this fall that was novel and far out of the ordinary.

In his yard there are a number of apple trees which were well laden this season ,but from which the Colonel neglected to gather the apples.

He was awakened from his sleep one night by a series of grunts in his yard, but thought nothing of the matter until morning, when he was surprised, on going out of doors, to behold a big black bear under one of the apple trees, as the Colonel says, "Stone drunk."

Bruin had been attracted by the apples and like the fox in the fable he had eaten more than his fill. The apples had fermented in his stomach as they do in the stomachs of the cattle and he had been unable to get away. He made a few feeble growls at the Colonel but could not rise to his feet and was at the mercy of the bear hunter.

The Colonel is not sentimental, and did not care to waste good powder on the drunken bear, so he went to the house and secured the big butcher knife that he kills hogs with in the fall and cut the bear's throat as though Bruin had been a common fat pig in the pen.

CLARENCE A. SANFORD.
Editor "The Catskill Mountain News."

THE LITTLE WIDOW.

TO THE EDITOR:

She is not an object of beauty. She displays none of those radiant tints changing with each motion; reflecting it would seem both rainbow and sun. She belongs to a most respectable family in Pigeondom—the Homers. No more stately birds step or wing anywhere in the States than her progenitors. No more iridescent plumage ever shone on any of the race than that displayed by the pair that brooded over her.

As though nature intended to invent something new and uncanny, and so failed to conform to general rule but one bird occupied the nest; occupied attention that house-keeping time.

What intention of utility, or of improvement on old-time specimens in bird-life actuated nature in creating a new model, the present does not reveal. That there was an intention seems to be proven by the fact that, shortly after the advent of this youngster, new we believe to ornithologists, another iridescent



"SHE IS NOT AN OBJECT OF BEAUTY."

little matron brooded over a similar oddity in a near-by nesting-place.

To-day the little widow passes up and down on foot amid her kind; partaking of their feasts, hustling out of the way of their drooping or uplifted wings; fluttering in wingless fashion to bathe or drink beside them, but while she is ever alert for her own safety in this winged, restless company, none ever seem to notice she is there.

If any realize that she is a scion of the old stock they utterly ignore the knowledge. She is never wooed to take up lodging in the dove-cotes, she circulates unnoticed among her own but her own know her not, and she drifts back month in and month out, toward human companionship, and shelters quite alone in the little box by the human hearth-stone.

Conditions were different with her at one time. There was one little friend who made no delay in wooing her on first sight. Like herself, a new though unimproved model of his kind, he missed not only the beauty but the utility of plumage, and beat the air fruitlessly with his featherless wings, endowed only with downless quills: gazed with apparent longing after the circling creatures of his kind, who swept above and around him but learned to know that for him the joy of flight was denied.

It has not been so very long since the two occupied the little box in company, and the little wife carried sticks and straws in the corner with thoughts of house-keeping. Those were happy days for her, even if the master of the house did give her an occasional rap over the head if she displeased him, nor did she ever retaliate, but would stand back and look at him like some exaggerated question mark while many a quill stood stiffly on end; this was all.

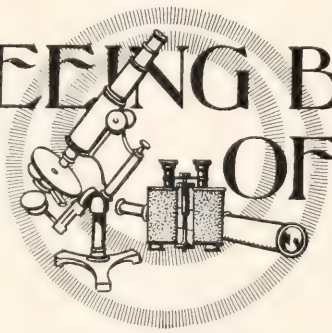
But there have been no straws or sticks carried to the box for many a week. That all ended with the day when the little mate lay bloody and dead on the lawn, and there was a new bird-grave under the apple tree.

Having no useable wings to carry her where she would in hunting for her little lover, she must have been very tired in those first days when she was always going; seldom resting.

The little widow seems to possess all the character qualities requisite for an acceptable and adored heroine, but if you will observe her portrait you will discover why she is ignored by every dove of the cotes, and why she drifts back day by day alone to the little box by the human hearth-stone.

GEORGE KLINGLE.

SEEING BY AID OF THE LENS

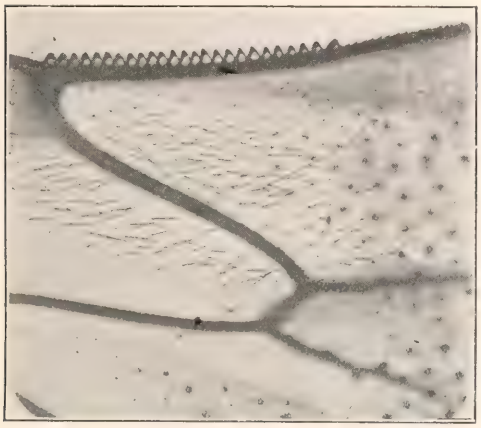


WINGS HOOKED TOGETHER IN FLIGHT.

Some one has said, "How well nature rewards looking into even the smallest matters!" The wing of an insect is a small matter, so gauzy, so apparently delicate and yet so strong; with its bracing veins that run between the two thin membranes that form the organ; the hairs and bristles on the two surfaces; and perhaps most interesting of all, the fold and the hooks which the honeybee possesses and without which the insect would be deprived of a good deal of its wing power.

Bees have four wings, two on each side. To have these two act independently of each other or even partly so would be a waste of muscular force and would result in a weak and uneven flight or in none. Nature does her little things

with as much care as her big things, perhaps with more. The two wings on each side of the bee's body must act together. Nature might have given the bee only one broad wing on each side but she did not. Now what can she do to make the two act as one, when the bee so desires? The insect must move and labor in narrow places. To have one wide wing standing stiffly out on each side would be



WING OF HONEYBEE, SHOWING HOOKS (ON UPPER EDGE).

disastrous, for such appendages in such narrow places would soon become torn and ragged and such an arrangement would in time result in undesirable modifications of the bee's structure. I cannot imagine how I should go about the solving of such a problem, yet nature has accomplished it in so simple a way that almost anybody might have done it if he had only thought of it. But nature has turned under the inner margin of the front wing so as to form a permanent fold, while on the outer edge of the lower or hindmost wing she has placed a series of hooks. "As the anterior (upper) wing moves outward into position for flight, its down turned plait passes over the upper surface of the lower wing and is caught by the upturned hooks; and now the two wings, wedded into one, strike the air; but at the moment the flying insect settles, these, by falling back into position, become immediately free, since the plait simply slips from the hooks, and the wings take up their superposed position." Simple, isn't it? And isn't its simplicity beautiful?

Another advantage in such an arrangement is that since the bee's wings move at so prodigious a rate (sometimes reaching four hundred and forty vibrations a second) a single narrow wing would not afford sufficient lifting power; but when the surface is more than doubled by hooking two together a different result is attained, the united wide membrane beats the air with a musical hum, the bee soars aloft and vanishes. It is only matter of a fold and a row of hooks.

"How well nature rewards looking into even the smallest matters!"

A SHY LITTLE FUNGUS.

BY MISS W. C. KNOWLES, WASHINGTON, CONNECTICUT.

A never failing trout brook which flows through shady woods and across green meadows has guided me to many interesting discoveries. It did so recently. After tramping through the underbrush one August day, I was about to cross this little stream when the shadow of a bird's wing in the alder thicket startled me, and as I paused to watch the play of sunlight on the yellowing cinnamon ferns which grew along the bank my attention was attracted by a small orange colored club that peeped



THE FUNGUS GROWING ON AN INSECT CHRYSALIS.

Fastened to a white card by two threads.

from beneath a decaying log among the ferns at my feet.

I poked my finger deep into the moist sand and pulled up a queer little fungus growing out of the head of a small chrysalis. The tip of the orange club with its white patches plainly showed, even to the naked eye, that the fungus had reached the fruiting stage. It was evident that a spore from some parent fungus had entered the larva and when the mycelium or root-like threads had filled the interior of the chrysalis and had sapped the life of its host the parasitic fungus had thrust out the fruiting head in order to scatter its spores on the wind.



MAGNIFIED VIEW OF THE FRUITING END OF THE FUNGUS.
Showing spore clusters.

It is rare for one person twice in a lifetime to chance on this shy little fungus, which the scientists call *Cordyceps militaris*, but it was my good fortune to find the same species in the summer of 1903. I believe that it then had a larva of the same kind for its habitat, which helps prove that this little parasite has cultivated a very selective habit. It is truly marvelous that Mother Nature can lodge a wind blown spore upon an unsuspecting larva and with one of her magic touches seem to transform a sleeping moth into a brilliant yellow fungus. But this transformation is of course only a poetic fancy. In reality, the larva furnishes nourishment to the plant, which the latter absorbs only for its own selfish interests. The animal is helpless, but it undergoes no transformation; it dies that the fungus may form, mature and scatter its spores.

THE SPINES OF THE SEA URCHIN.

The common sea urchin is an animal so peculiar in many respects that a description of it would probably fill the whole magazine and be so scientific that the general reader would not care for it. The usual urchin found along the Atlantic coast of the United States is nearly hemispherical in shape and has the mouth near the center of the lower, flat surface, where are also placed the many little projections that it uses as feet and with which it slowly crawls over the sand in search of seaweeds, bits of dead fish and other favorite food.

The upper surface of the animal is covered with stiff spines almost as hard as stone but which yet have an internal structure that is wonderfully curious and, under the microscope, wonderfully beautiful. But to show this internal arrangement, the spine must be cut across

into slices so that they will be transparent or at least thin enough to allow the light to pass through them.

To make slices of such hard bodies demands a good deal of skill on the part of the microscopist. The spine is first cut with a fine, sharp saw into sections as thin as possible and these slices are then carefully and gently rubbed on a finely grained whetstone until they are thin enough for microscopical examination. This must be done with great care or the hard and rather brittle pieces will be broken and the workman will lose his labor for the section will then be spoiled for any satisfactory study.

Figs. 1 and 2 show sections of two

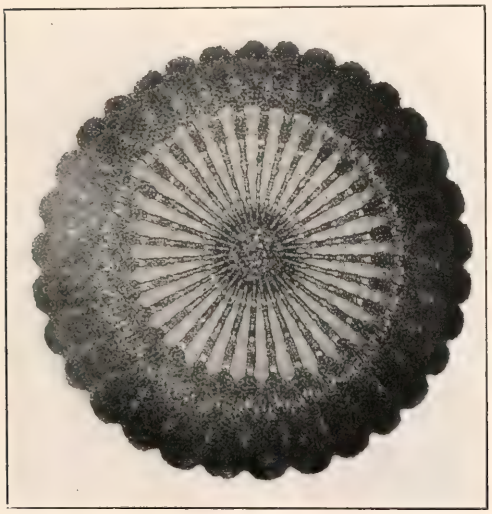


FIG. 1. TRANSVERSE SECTION OF ECHINUS SPINE.

spines from two different species of sea urchins. Both are greatly magnified and both are pleasing in appearance by reason of the regularity of the parts. The inside parts of many things made by nature are more interesting and attractive than the outside. It is so in the case of the sea urchin's spines. Outwardly they are apparently only solid, nearly smooth rods of stone, but when the microscopist has prepared them for his favorite instrument they reveal unsuspected beauties and unsuspected points of interest and of instruction.

In Fig. 3, five similar sections are arranged in a group for comparison. The four outer objects that resemble little

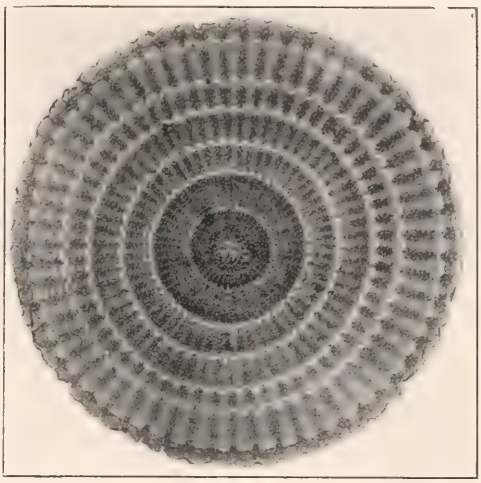


FIG. 2. SECTION OF ECHINUS SPINE FROM ANOTHER SPECIES.

cogwheels are placed there only to ornament and complete the picture. They are not sections of the urchin's spines.

BEAUTY OF THE COMMONPLACE.

After all, the great lesson is that no special natural sights, not Alps, Niagara, Yosemite, or anything else, is more grand or more beautiful than the ordinary sunrise and sunset, earth and sky, the common trees and grass.—Walt Whitman.

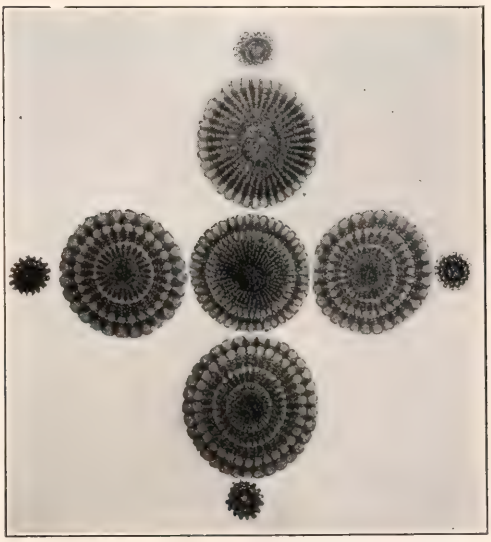


FIG. 3. GROUPED SPECIMENS OF ECHINUS SPINES.



ALLIGATORS AS PETS.

BY DR. G. A. HINNEN, CINCINNATI, O.

Almost twelve years ago a friend offered me an alligator which he had received as a gift, but which he was "unable to appreciate." It was a cold day in February when I called to get the 'gator; so I wrapped it in my book bag. My joy knew no bounds, for I had often hoped and wished for a pet alligator; but joy was soon turned to sorrow, for father would not permit me to keep it. Alligators had most unsavory reputations; they were man-eaters, etc., etc. So the little fellow (he was scarcely ten inches long), was taken to the University, where he was to be dissected, and I could then retain the skeleton. Arriving there, the Professor of Biology handled the little stranger with impunity, and said it would be a pity to kill so small and inoffensive a creature. "Take it home and make a pet of it," was the professor's advice, knowing how successful I had been with snakes, turtles, frogs and like animals. So after promising to keep the terrible beast in a strong enclosure lest he get out and eat up the cat and the dogs, I was finally allowed to keep the meek little Floridian.

The literature being very meagre as to the food of these animals, I was at a loss what and how to feed my new arrival. Meat was fastened to a pole, and with another pole (and they were quite long I assure you), an effort was made to pry open the poor beast's jaws; all efforts proved unavailing and so we finally stopped in despair.

Weeks went by and the mutual fear which had been inculcated by the 'gator's hissing and our prodding, gradually gave way to a feeling of confidence and good fellowship. Spring with its warm days and cool nights stirred the 'gator to some activity, for it would bask in the sun during the day and go into the water at night; but no attempt was made at feeding and my hopes sank, fearing the poor creature would surely starve to death. But one day at the beginning of June my wish was gratified, for 'gator snapped up a big blue-bottle fly I had thrown into his tank. Flies, spiders, earthworms, and cockroaches were now taken readily and 'gator began to thrive, his lean sides began to fill and he grew stouter and heavier.

On dark and cloudy days, especially when there was a drop in the temperature his appetite diminished, but on hot sunny days it knew no bounds. About the middle of September he ceased eating altogether and absolutely refused all food until the following May or June. Even fish, the favorite diet, will not tempt the 'gator during the winter months.

For two years 'gator lived alone in a vivarium with a number of tortoises frogs and snakes, but one day I received another little fellow, and the two have lived on the best terms of friendship ever since. The second one was about as large as the first one had been when I had received him, but he was not as strong nor quite as plump.

The gathering of a pint or two of earthworms every day soon grew to be an enormous problem, and after three years all my available supply had become exhausted. I was now confronted by what seemed a most difficult problem, viz., finding a substitute for the worms. Fish were expensive and hard to get, and furthermore, they could only be obtained on certain days of the week; flies were too small and it required entirely too many, and the "chameleons" took



WAITING FOR FOOD.

all of those; so after many devices I resorted to beef hearts, the meat being firm and fairly tough, devoid of fat, and lends itself nicely to being cut into strips resembling worms.

For some time the 'gators did not like this substitute, but now take it readily and in unlimited quantities. For variety they get fish, frogs, rats and kittens, whenever the latter are obtainable. As tid bits the larger one enjoys cockroaches and blue bottle flies.

Usually the food is taken in the water, or carried into the water should it be taken on land. The head is elevated above the water and with a few gulps the act of swallowing is completed; there is no mastication at all. If the jaws are opened and closed a number of times during the act of swallowing, it is done simply to readjust the food in the mouth, or to break it into smaller bits. Occasionally a long piece of meat or a fish protrude at the angle of the mouth; this is adjusted by either a vigorous shake of the head or by the aid of the hind foot.

Ordinarily lethargic in their movements, the speed at which an alligator can run in pursuit of prey is truly remarkable. As a rule a 'gator rests after taking only a few steps, but when after food they may run a distance of fifty or seventy feet without letting down their body a single time, the body rising high from the ground when the animal walks.

The sense of smell is highly developed, in fact seems to be the most acute of all the senses. Recently the larger one smelled some rats at a distance of fully fifty feet.

The alligators have an enclosure 6 by 13 ft., in the center of which there is a pool 4 by 6½ ft., and varying in depth from 3 to 14 inches; this has an over-

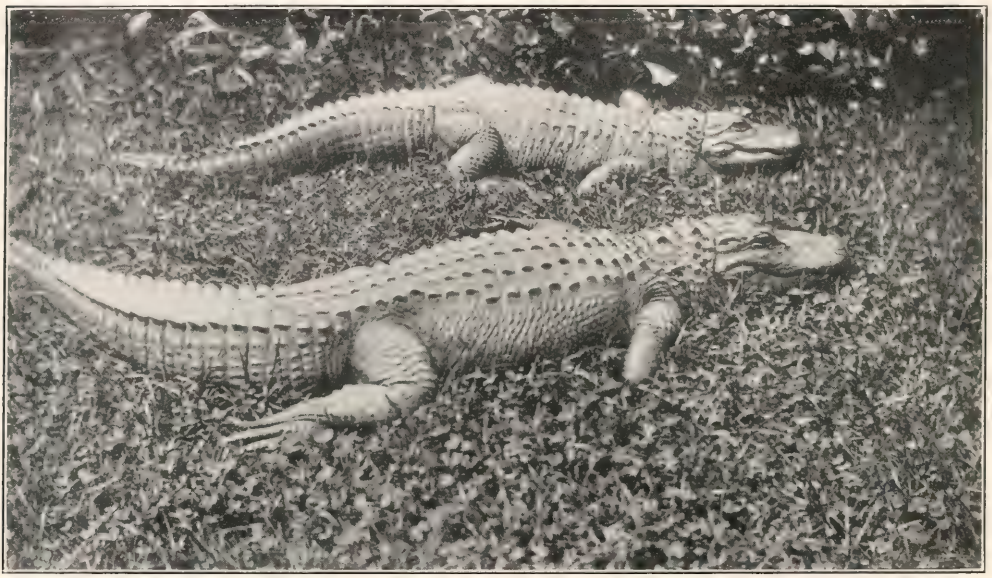


WITH A PIECE OF MEAT IN HIS MOUTH.

flow allowing a garden hose to be turned into it ad libitum. One of the 'gators' chief delights is to play with the stream of water as it rushes into the pool; frequently the water is allowed to fall from some height, and then the larger 'gator disports himself in it, allowing the stream to run into his mouth and on his back. A covered portion of the enclosure gives them shelter from heavy rains and intense sunshine should they desire it. A gateway opening into the yard allows them free exit, and all day they roam about the premises; they can be found at any place in the yard, or if not there will be found in the house, where they explore all corners, climbing on to chairs, boxes, into the dog's beds, and constantly being on the alert to slip into the stairway to get upstairs. When determined to get into the house nothing will swerve them from their purpose, for they will scratch at the screen door persistently, and if driven away again and again, will invariably return, accompanying their scratching with grunts until they are permitted to enter, a thing they seem to enjoy more than any other pleasure. They are on the best terms of familiarity with the dogs and cat, walking about among them and often sleeping peacefully within short distances of each other.

A most interesting performance is to see them tobogganing down the stairs; with the toes of the fore-feet fully outstretched, the legs slightly bent, and the hind legs projecting backwards and closely applied to the tail, the 'gator slides down the stairway in most rapid and ludicrous fashion.

They walk all about us, creeping under our chairs while we are seated, and when basking in the sun on the walks or on the lawn, allow you to step over them, never thinking of getting out of your way. The larger one enjoys being patted on the head and having his back rubbed; the smaller one, of a surly disposition, does not enjoy familiarity. Again and again we have compared them to our two dogs, the larger one being of a friendly and lovable disposition, the smaller one, like the small dog, surly and ill-tempered; he hisses when provoked and frequently also when not provoked. Among themselves they get along most harmoniously, manifesting a certain fondness and attachment for each other, evinced by a peculiar bellowing and grunt of satisfaction. If alarmed the large one utters his deep bass notes,



THE PET ALLIGATORS IN THE BACK YARD.

The larger is over four and a half feet. Raised from little fellows scarcely eight inches in length.

making one stop and ponder, especially when they are sounded suddenly and without warning at night; and when this is done in the house during the winter months, the noise is truly terrific as it echoes back and forth.

The eyes usually lusterless and with a small slit-like pupil during the day, assume a far different aspect at night when the pupil becomes round and the whole eye sparkles with animation.

Unfortunately I can not report such a wonderful rate of growth for my alligators as does Mr. Raymond L. Ditmars for his 'gators in the Bronx Zoo at New York City. In the latter instance the water of the pools is kept uniformly heated; this I am unable to do; but from careful observations my 'gators have averaged about four inches of growth per year, the larger one now measuring 4 ft. 6 inches.

They have been a most interesting study and have afforded many hours of amusement. Instead of being ferocious and dangerous, the very opposite must be said for them. And of all pets they require least attention and are least troublesome, requiring no food for fully 8½ months of the year. If the temperature of the room and the water were kept constantly uniform, hibernation would not ensue and the metabolic functions would continue through the winter months. This reminds me of an interesting episode which occurred a few years ago.

One evening I received a caller in the person of the secretary of the Ohio Humane Society. The Society had been notified that a family were abusing an alligator; in other words they were starving the poor beast. An officer was dispatched on the case to make an investigation and an arrest. The people made every effort to feed their 'gator, but all food was refused; the officer being convinced of this fact, felt he was not justified in making an arrest for cruelty. He reported the case at headquarters, with the result that I was called in for expert testimony as the Society was at a loss what to do. Needless to say no arrest was made and the kind and sympathetic secretary felt greatly relieved.

THE QUESTION OF HYDROPHOBIA.

BY C. H. JONES, PUBLISHER *Pet Dog Journal*, ROCHESTER, N. Y.

Does hydrophobia exist, or is it only a scare? We know there is something but how much of it is real and how much is imaginary? By a little investigation we learn that the commonly heralded disease known to the medical fraternity as hydrophobia or rabies exists so very rarely that it practically does not exist at all.

The vivid imagination of the space writer is largely at fault for the popular and prevailing idea that "mad dogs" are common, and that they are "running down the street foaming at the mouth and snapping at everything, and everybody in reach."

The fact is that a dog that really has this trouble, that is so scarce, never foams at the mouth; he very rarely, if ever, runs, but hides under a barn or porch; or in some quiet, dark place; he never even in the running stage of the disease moves out of his regular way to bite anything.

The writer one day, in Rochester, N. Y., saw a crowd standing about the entrance of a large store. He stepped up, and asked one of the bystanders the cause of the excitement and the man replied that there was a dog in the doorway that they thought was going "mad."

This was interesting, to see a real "mad" dog was really something to be desired, something that we had claimed did not exist very often. In fact we had claimed that it really existed about as often as leprosy. We walked through the crowd and saw a black Cocker Spaniel crouched down in the door way looking with frightened and pleading eyes at the excited crowd. I said: "What's the matter old man, are you frightened?" and his stubby tail commenced to beat the floor and his fawning caresses proved that he knew a friend and was glad to see one.

A man in the crowd asked, "Isn't he mad?"

I said, "Of course he is mad, how could he help it surrounded by a lot of yelling 'yaps' the way he is," and the crowd faded away, the dog was



BABY FRANCIS GREGG AND DUKE HIS FRIEND, AT THE PHOTOGRAPH GALLERY.

soon all right, found his master and went on his way rejoicing.

Just suppose that he had been out in the open where he could run. The yelling crowd would soon have started him and for the time he would have been unaccountable for his actions. He would have snapped at anything or any one in his desperate endeavor to protect himself from his enemies. Get him in a corner and he would bite, run him far enough and hard enough and yell at him enough and he would foam at the mouth. Have a policeman ready and he would be shot and the ready reporter would have all the material necessary for a half column article on the "mad dog."

Another case and another crowd. Passing on a wheel and seeing a crowd, investigation revealed a dog lying on the path in a front yard in a convulsion, brought on no doubt from too active exercise on one of the early warm days in spring. He was foaming at the mouth and the oracle of the crowd volunteered the information that the dog was mad and had run so far that he had dropped down in an exhausted condition, but he said "A man has gone for a policeman and he will be shot." Walking up to the door and ringing the bell, I said to the lady who came, "Madam, your dog is in a fit, if you will give me a little cold water I will wet the top of his head and

he will be all right in a few minutes." She replied, "Will you bring him in the house?" I took him in the bath room wet the top of his head thoroughly and his muscles immediately relaxed, and when he opened his eyes I allowed a little of the water to trickle into his mouth which he eagerly lapped and in less than three minutes he became fully conscious and licked the hand that had helped him.

In the meantime the owner of the dog came around the house and came in the back door. He was surprised that his dog was in the house and that the man who had hold of him was alive.

He said, "I was afraid of him and stepped over him and came in this way."

I know a lady to whom every dog in the world is a standing menace. Owing to her active imagination she suffers constantly over something that does not exist. She could almost have a case of rabies from looking at a picture of a dog chasing a woman. If she was ever bitten she would, undoubtedly, hasten at once to some Pasteur Institute where she would be innoculated with the germ of rabies and would then have it for sure. A little hot water on the wound, or a little disinfectant and all trouble would be over. Treat the wound the same as you would a scratch made in any other way.

The following well-known medical investigators are among those who have been searching for years for authentic cases of rabies and have failed to find one: Dr. Lutaud, of Paris; Dr. Bell-Taylor, of England; Dr. Charles W.



TOY SPANIELS, OWNED BY MRS. C. E. LAMOREE, OF ROCHESTER, N. Y.

MISS GLADYS EVANS, of Rochester, N. Y.

With "Suzette" and "Blackie," Mrs. Lamoree's Toy Spaniels.

Dulles, of Philadelphia; Dr. E. C. Spitzka, of New York; Prof. J. W. Hern, of Philadelphia; Dr. Hiram Corson and Dr. Thomas Mayo.

In New York, since 1894, there have been gathered by the Society for the Prevention of Cruelty to Animals 1,515,513 dogs and cats. During which time there have been an average of 26 men employed daily, and each of these have been bitten on an average of four times a month, making in the fourteen years about 17,000 bites on probably 100 different men. The bites were distributed on hands, neck, arms, limbs, body and face. Not a single case of hydrophobia has resulted from these bites. The employees take the bites as a matter of course, have them cauterized and dressed, go about their business and think no more of it.

The AGASSIZ ASSOCIATION

SOME ORIGINAL OBSERVATIONS.

BY MISS ALICE SPRINGSTEAD, KALAMAZOO, MICHIGAN.
CORRESPONDING MEMBER NO. 2,000.

I took a trip by water from Detroit to Sault Sainte Marie this summer. It was so interesting to watch the gulls follow the boat. They would show up about mealtime. Whenever anything was thrown over they dived after it. I was especially interested in the way they turned their heads from side to side watching for food. They came very close to the boat.



THE ICHNEUMON COCOONS FROM A TOMATO LARVA.

I was also interested to note the difference in the trees. Up there, there are so many pines and spruces.

While at the Zoo I went through the government locks in an electric launch. They were a wonder to me—those large freight boats being lifted up and passed on or being lowered to the lower level of the St. Mary's River.

While out in the country this fall in September the boys tried to extinguish some yellow jackets that had a nest in an old apple tree and bothered the horses, for the tree is used as a hitching post. They used fire. I got a piece of the nest with the larvae in and one bee. I put them in a box and the next morning I had three bees instead of one. I brought them home and bees kept coming out. We had a very hot spell for a few days. I put them in a glass dish and set them on the window sill outside so they could get at the flowers below but they never left the dish even when the sun became very hot, for I forgot them for a while and when I went to look they were all dead. I opened a number of the cells and found all stages of development,

from the little fat worm to the soft, fully developed bee just before it comes out to maturity as it comes out. I wish I had known how to preserve them.

I also found a tomato worm covered with little cocoons and also some of the tiny ichneumon flies that come out of them.

CURIOUS ROOT GROWTH.

I want to ask you about a very curious tree I saw in Sugar Hill, New Hampshire. It was a yellow birch and was growing against a large boulder. At the bottom there seemed to be two distinct trees; as far as I could see there was no connection whatever between the roots or the two trunks which came out of the ground at fully a yard's distance from each other.

These two trunks, each in itself a perfect tree trunk with no sign of a scar as if they had been split apart, grew up over the rock, leaning against its face and still keeping their distance apart until they reached the top of the rock where they turned towards each other, met and formed one tree! Now they are not twisted together and they do not singly grow up close against each other, but they blend together and form *one* perfect tree! There is no sign of a crevice between them, the trunk is round and smooth and the bark unbroken.

Now how is this possible? If there are two trees in the first place, how can they form one tree without a sign of a crack between them; and if it should be all one tree, why should it grow together again after having the parts so widely separated? The tree is called "The Struggle for Life" and is one of the sights of the place.



Photograph of the tree that probably started in leaf mold on top of the rock. The roots have become trunk like.

Photograph by L. S. Nickerson, Sugar Hill, N. H.

Dorothy A. Baldwin,

Corresponding Member No. 2030.

LITERARY AND BIOGRAPHICAL

Nature Study. By Frederick L. Holtz, A. M. New York: 1908. Charles Scribner's Sons.

Among the many nature study publications that appear from time to time, it is not often that we find so thoroughly satisfactory a book as Professor Holtz's "Nature Study." It is essentially a teacher's manual but most of it will be of equal interest to the individual student.

Professor Holtz bases his theory on two fundamental traits of child nature, curiosity and social instinct; the one prompting the child to investigate the objects and forces with which his life comes in contact, the other leading to a sharing of the knowledge thus gained with companions and making a practical use of it in his life. From this starting point the author develops his nature study theory in a sound and logical manner. He would teach nature study to train the senses and to impart that knowledge of the child's surroundings that will be of practical value and enable him to get the most out of life.

In the second part of the book a chapter is devoted to each department of nature study work, suggestive subjects and outlines being given, but it is the third part which we believe to be of the greatest value. It contains a graded course for the eight grades with suggestive work for each season of the year. Plant life, tree study, insects, birds, animals, physiography and physiology are all included. In fact, it might be criticised as being too comprehensive a course, but to the teacher who can select the subjects suited to her class it will be the more valuable on account of the wealth of material it suggests.

So many of the nature study courses that have been placed in the hands of teachers compel the use of subjects ill-suited to the needs of the pupils that we hope this course prepared by Professor Holtz may become generally known. While we might criticise minor faults, this work remains one of the best books of its kind in the field and we gladly recommend it to teachers and students who would prepare themselves for the best kind of nature study work.

E. EARL DUBOIS.

Parables From Nature. By Mrs. Alfred Gatty, Cr. 8vo; two volumes in one, pp. 558. Illustrated. New York: G. P. Putnam's Sons.

To the amateur naturalist who is religiously inclined, this beautiful book will be a treasure, comfort and inspiration. Taking some of the simplest facts in nature, the author weaves about each of them a charming allegory in which the birds, the insects, the lower plants and the watery vapors are the actors, and become the reader's teacher. The green caterpillar on the cabbage leaf suffers agonies of anxiety, when the dying butterfly puts a cluster of eggs in her care, urging her to nourish the young butterflies with nectar and morning dew. What can a crawling caterpillar know about butterflies and nectar? Her food is coarse cabbage. But the soaring lark teaches the unhappy caterpillar that "all things work together for good to them that love God," and that her lack of faith was causing her needless trouble. The young sedge warblers are worried. "Mother, why do you sing songs about another land? Cannot we all build nests here, and live here always? I want no other land, no other home but this." Then the mother changed her note and sang, "This is not your rest. There is an Unknown Land; where I do not know, but let us go forth to that Unknown Land, wherever it may be, in joyful trust."

The author has a pleasing fancy, and a poetical method of treating scientific facts that make her book a delicate and dainty sermon of the most acceptable and encouraging kind, and in which she reminds the less thoughtful that the laws of Nature, which are the acted will of God, work together in all cases for a good end, for our comfort and to increase our happiness. "It was a blessed creed for the Student of Nature, though it cost him a struggle to adhere to it when the lightning was flashing around him, and the thunder roared in the distance, when he saw from the windows dark clouds hanging over the landscape. But he held fast to the humility and faith of childhood, and where his mind was unable to penetrate, his heart was contented to believe. Well is it with those who in the secrets of Nature read the wisdom of God."

The book suggests helpful thoughts, and in this work-a-day world, where briars seem more abundant than flowers, and thorns more numerous than berries, where it is not easy to keep one's faith and trust in the unseen God who really does all things well, it will be consoling. It should remind of better things to come, when the heavens are like brass, and the clouds hard to look through, because they represent mental troubles. The Student of Nature who becomes despondent, should keep Mrs. Gatty's graceful Parables where he may reach them at a moment's notice.

THE GUIDE to NATURE

STAMFORD, CONN.

EDWARD F. BIGELOW, Editor

VOL. 1 DECEMBER, 1908 Nº 9

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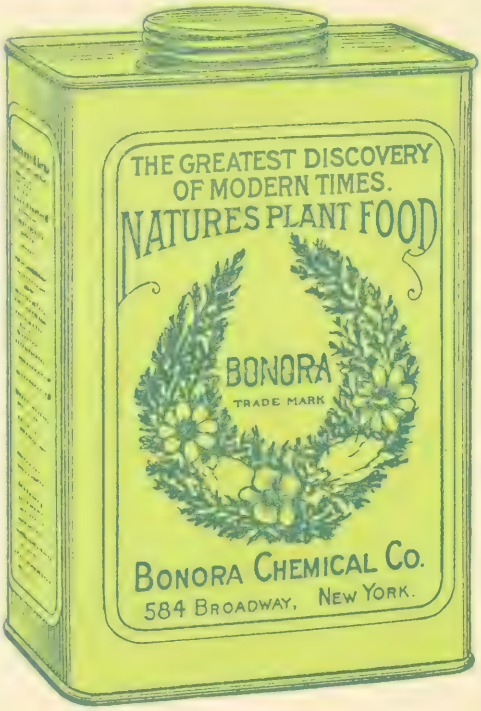
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THE FIRST SNOW FALL.

Photograph by Miss Sarah Weaver, Plattsburg, N. Y.

Life is an unfoldment, and the further we travel the more truth we can comprehend. To understand the things that are at our door is the best preparation for understanding those that lie beyond.—Hypatia.

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I DECEMBER, 1908 No. 9

THE OUTDOOR WORLD

Silkworm Rearing as a Popular Pursuit

BY T. A. KELEHER, EXPERT SILK CULTURIST, WASHINGTON, D. C.

THE fascinating work of silkworm rearing has become a popular pastime with some people and many an interesting hour is spent by these amateur silk culturists in following the gradual development of the "worm" from the day it issues from the tiny egg, watching its every movement, its growth to maturity, the remarkable energy it displays in the building of its silken home, and at length its emergence from the cocoon as a beautiful cream-colored moth whose sole object is to lay eggs for the perpetuation of its species.

In various books, silk culture is briefly mentioned, but to gain a better knowledge of the nature and habits of the wonderful little silk producer than can be obtained by the mere study of pictures and descriptions, one should secure some silkworm eggs, which when hatched out may be easily cared for and will offer an excellent chance to observe each day how these little creatures pass through their different phases of development.

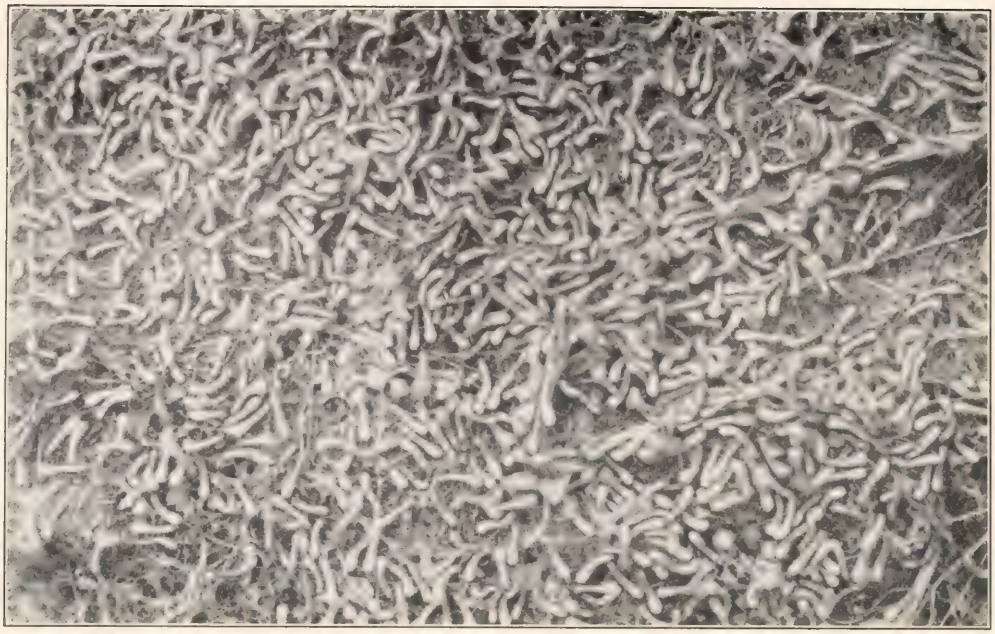
The eggs may be obtained during winter and kept in a cool dry place until the mulberry leaves are out in the spring. A perforated tin box makes a good receptacle to protect eggs from rats and mice, which are very fond of them.

Following is a description of how the silkworm is reared and silk is made:

NATURE OF THE SILKWORM.

The silkworm proper, or the species which has been under domestic cultivation in China for many centuries,

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FIRST OR BABY AGE OF THE SILKWORM.

Silkworms in this picture are about four or five days old. Some of them are now in molt while others are about to enter the first molt or a short period of sleep.

and in Europe since the sixth century, and from which the ordinary silk of commerce is produced, is the larva or caterpillar of a medium-sized moth, which feeds upon the leaf of the mulberry tree. This insect known to science as *Bombyx mori,* belongs to the order Lepidoptera, family Bombycidae, or the "Spinners," and is popularly called the mulberry silkworm.

When the mulberry leaves, the food of the worms-to-be, begin to unfold in the spring, the eggs may be hatched by exposure for ten or twelve days to a warm temperature. The larva spends most of its time in feeding; it grows rapidly and finally attains a length of about 3 inches.

The larval stage lasts from about thirty to thirty-five days. It is divided into five different ages, separated by what are called molts, at which time the worm casts its skin. The rapid increase in size of the insect renders the original skin too small to allow for its growth, and hence four molts occur. When the full-grown worm is ready to spin its cocoon, it crawls over the leaves, shrinks somewhat in size, and, according to the race of the worm, is now white or yellow, ,and semi-transparent. Climbing upon some suitable place it commences to throw out threads of silk at the rate of sixty-five motions of its head per minute, or three hundred thousand in building its cocoon. The thread of a cocoon is continuous and varies in length from 750 yards to 1,200 yards. Cocoons vary also in weight from 275 to 400 to the pound for newly spun, or from 450 to 600 to the pound for dried cocoons. It requires three and three-quarters pounds of cocoons to produce a pound of reeled or raw silk, a pound of raw silk being sufficient to make at least 10 yards of the very best silk. In from two to three weeks the covering of the chrysalis, which is enclosed in the cocoon, splits, and the cream-colored moth within secretes a liquid which moistens the end of the cocoon and dissolves the hard, gummy lining. Then, in the early morning hours, the moth, with crimped and damp wings, emerges; a short time afterwards the wings become unfolded and dry and the mother moth begins laying her eggs.

numbering about four hundred. The moths live but a short time and partake of no food.

PROPAGATING THE WORMS.

When the worms issue from the egg they measure one-eighth of an inch in length. They are ready for food at once, and finely chopped tender mulberry leaves should be prepared for them. During this age they require at least six meals daily, and at the end of the fourth or fifth day bobinet, upon which some finely chopped mulberry leaves have been scattered, should be placed over them. The baby worms soon become aware of the presence of fresh food and, leaving the old food, pass through the netting to the fresh leaves placed above. When this occurs, the old netting should be removed with the remains upon it.

About this time the first molt takes place. The worms hold their heads up, are motionless, and appear to be asleep; this indicates that feeding will cease for at least from 24 to 36 hours. During the molt the tray upon which the worms have been kept should be cleaned so that the little worms may have everything in their favor after they have molted.

When the first molt is completed the worms begin their second age with an increased appetite, and no food should be given until several hours have elapsed, allowing the little creatures sufficient time to recover from the effects of the change. During this age which is the shortest, lasting but four days, six meals should be given daily, and the worms should be transferred twice from the old to fresh leaves.

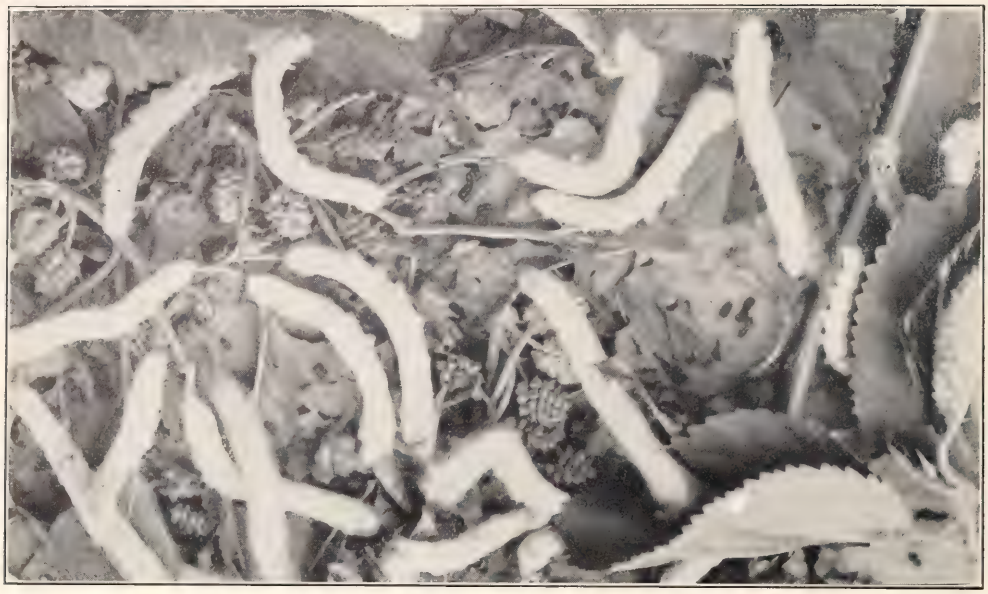
On the fourth day the worms molt the second time and are then in the third age, which lasts six days. Six meals should be given daily of coarsely-cut or whole leaves. The worms are now too large to rise through the netting but they may be transferred to another tray after all have crawled on fresh leaves, the old debris being then cleared away.

On the sixth day of this age the worms molt a third time and begin the fourth age, which lasts six or seven days. The insects now become interesting objects for study, as they grow



SILKWORMS IN THE SECOND AGE.

The worms in this age are now assuming a more whitish color and are more easily handled. They are on a tray and have pretty well devoured all the food in sight, the only thing that remains in the way of food being the veins of the mulberry leaves.



THE SILK WORM IN ITS THIRD AND FOURTH AGE.

The insect at this age is extremely interesting by watching how it voraciously devours its food plant. You will notice there are mulberries among the leaves. The caterpillars will eat the berries if they cannot find any leaves.

rapidly. They now require more food and small branches of mulberry should be given four or five times daily. At the end of each day branches of mulberry are placed over the worms, and as soon as the worms have all mounted to the fresh food the branches with the worms upon them are transferred to an empty tray; the tray containing the old leaves should then be cleaned and made ready for the next day's transfer.

The next or final molt is the most critical and laborious, and should there be any disease lurking in the worms it will surely manifest itself at this time After the worms have undergone this molt they are in the fifth and last age. Fresh food should be given constantly during this period, for in this age the worms consume more food than during the whole of their previous existence.

PRECAUTIONS TO BE TAKEN DURING THE LARVAL STAGE.

Do not disturb the worms while in molt. Never allow the sun's rays to shine upon them. Guard against the invasion of rats and mice; they are the silkworms' worst enemies. Avoid feeding with stale, damp, or wet leaves. Maintain if possible, an average temperature of from 70° to 80° F.

PREPARATIONS FOR COCOON BUILDING.

At the end of eight days of voracious feeding after the final molt, the worms begin to crawl over the leaves without eating, shrink somewhat in size, and change in color to a semi-transparent white or yellow; they are restless, rear their heads as if in search of something to climb upon, and begin to throw out threads of silk. When these signs are noticed everything should be prepared at once for the spinning of the cocoons, in order that the worms may not lose their strength and silk in seeking for the support they require. Branches of small twigs or any clean, well-dried brush, free from leaves, may be collected and made into small bunches, one end being tied and the other allowed to spread out so that the worms may mount and spin between the branches. Ladders such as is shown in the accompanying photograph, are sometimes used. Cornucopias, sufficiently large to permit the

worms to move the head from one side to the other in attaching their silken filaments, can likewise be used. The spinning worms should be gently lifted by the fingers and placed wherever they are to spin their cocoons.

COCOON GATHERING.

The cocoons may be gathered eight days from the time the worms begin spinning them. Those which are to be saved, the moths not being permitted to emerge, should be placed in clean pans in an oven and left there for several hours with a temperature of about 200° F. A higher temperature would be likely to burn the silk. This is one of the ways in which the enclosed chrysalides are killed when the cocoons are to be used for silk production.

EMERGENCE OF THE MOTHS.

Cocoons which are set aside to await the emergence of the moths may be strung upon a strong sewing thread, run through the side of the cocoon, great care being taken not to pierce the enclosed chrysalis with the needle. They may then be hung in some place that is free from rats and mice, to await



FEEDING THE CATERPILLARS ON A CLOTHESHORSE.

An ordinary clotheshorse is here used by placing small racks upon each section. It can be placed in any ordinary room while members of the family can go around on each side of it during feeding time.

the forthcoming moths, which should appear in from two to three weeks after the cocoons have been formed.

EGG-LAYING.

The room in which moths are produced should be darkened, only sufficient light being admitted to enable one to distinguish objects. In from eleven to eighteen days from the spinning time the moths begin to come forth from the cocoons laid aside for breeding purposes.

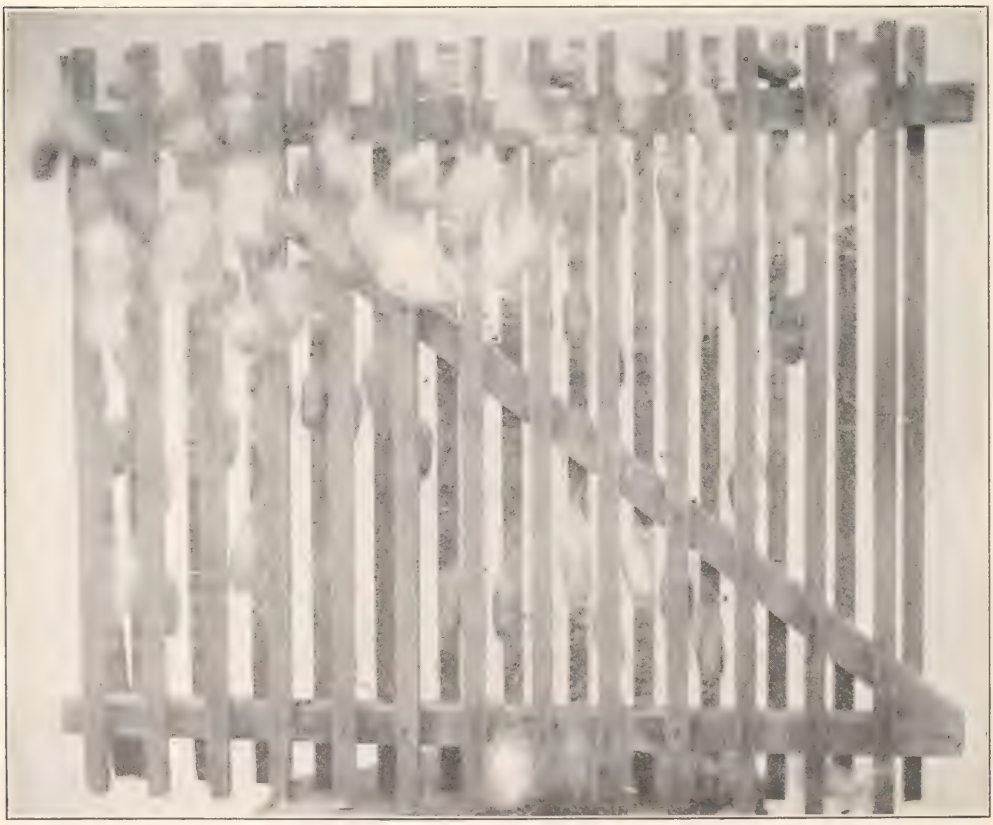
The male is more slender, and will be observed fluttering his wings and moving about actively, whereas the female is heavy, and she remains very quiet. Several hours after emerging take them gently and place them by pairs, a male and a female together, on small pieces of cheese cloth.

The eggs adhere to whatever the moth deposits them on by a natural gum, and being fastened, the worms when hatching issue from the eggs better.

FOOD-PLANTS.

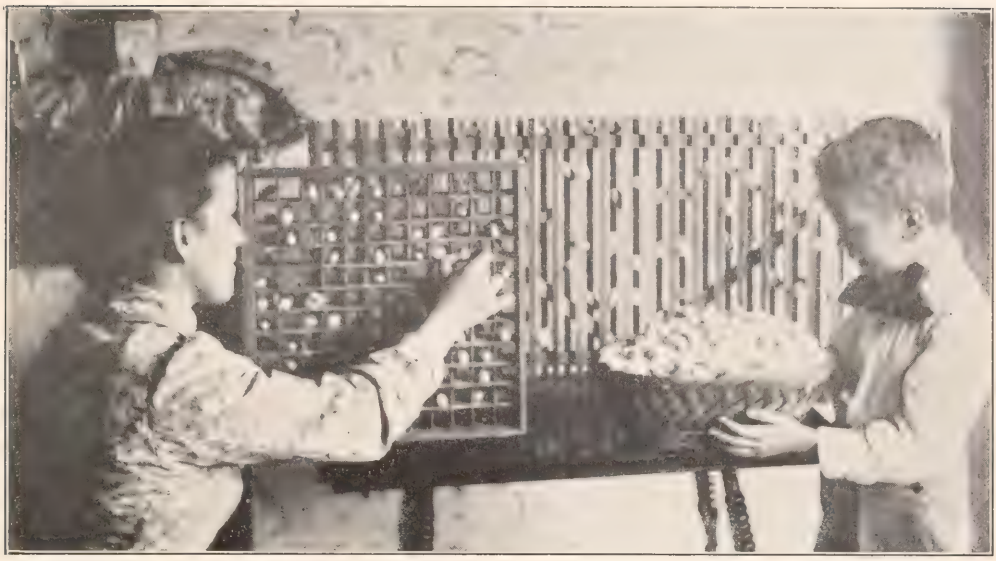
The natural plant food of the silkworm is the white mulberry. There are a number of species of the mulberry, but the one best adapted for the feeding of the silkworms is the white mulberry (*Morus alba*) and its varieties. Osage orange, commonly called Osage hedge plant is an excellent substitute and may be used where the mulberry is not available.

This brief description of the method of cultivating the silkworm is not intended for those persons wishing to engage in it for profit or on a commer-



A MODERN AND UP TO DATE COCOON CONTRIVANCE.

The worm in spinning its cocoon wishes something of this sort so man has tried to please the little creature by furnishing it with a ladder so constructed that the insect can ascend easily through the spaces and throw out its silken threads from one side to the other. Within the silk network is the pod which is the cocoon of commerce.



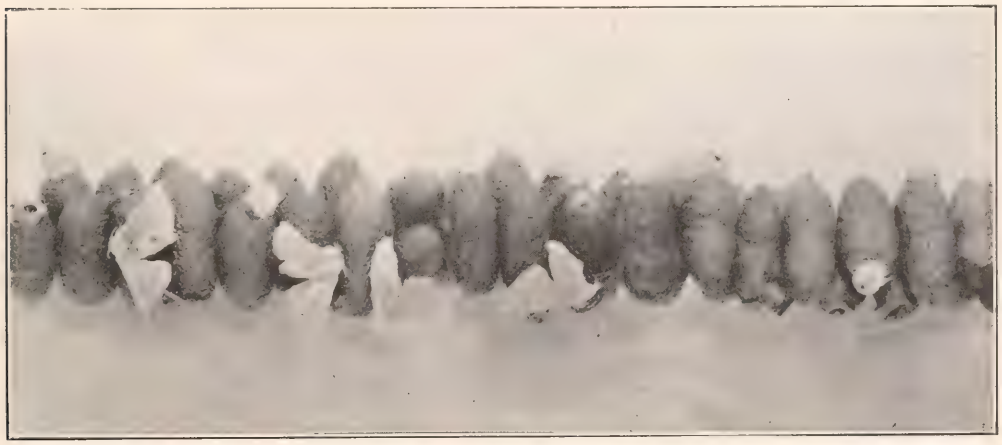
MEMBERS OF THE FAMILY GATHERING COCOONS.

Ladders filled with newly spun cocoons are placed upon a table while one can sit and enjoy removing the cocoons. Children seem to take great delight in assisting in cocoon gathering. It is the winding up of the work so far as feeding the worms is concerned. The basket contains a fine lot of firm cocoons.

cial basis, but only for those who desire to take it up as a pastime, in an experimental way. It is an unusually interesting pursuit and, if only as an amusement, should appeal to all nature lovers.

In addition to what has already been said concerning the life story of the domestic silkworm of commerce, I would suggest that students in nature work should be provided with an educational nature study exhibit illustrative of the silkworm in its different stages of development from the egg state to the moth, including products and food plant.

The specimens should be of the very best that can be obtained. Leaves should be prepared so that they show up nicely



MOTHS EMERGING FROM THE COCOONS IN THE EARLY MORNING HOURS.

Moths are now rapidly emerging. Some have already emerged while just the heads of others are peeping out. It takes less than a minute for the little prisoner to make its escape, nature having provided a liquid which the moth throws against the prison wall softening the silken threads and enabling it to come out easily.



COMPLETE TRANSFORMATION OF THE SILKWORM FROM EGG TO MOTH.

Caterpillars in different ages in search of food. At base of branch, silkworm spinning cocoon; at top of branch, the newly finished cocoon surrounded with floss; in the middle of branch, cocoon of commerce; to the right, the moth emerging from the cocoon and passing up to the mulberry leaf to lay its eggs; under the mulberry leaf, cocoon pierced by the emergence of the moth; at base of branch, cocoon cut in half showing chrysalis stage; moths on right and left of branch.

and, as far as possible, in their natural position. In the exhibit the larvae should be represented as ten day old, twenty day old and thirty day old; they should be placed separately in vials containing alcohol, it being the best preservative for silkworms.

Cocoons should be well formed and, if possible, show the differently colored ones. They should be classed as follows: the cocoon of commerce; the cocoon as pierced by the emergence of the moth; cocn surrounded with floss or the network. A well developed chrysalis and a perfect moth should complete the life cycle of the exhibit.

HOW THE VINEGAROON AND THE GALEODES KILL THEIR VICTIMS.

BY R. MENGER, M. D., SAN ANTONIO, TEXAS.

Lately I had the pleasure of making some nature study on two rare and venomous insects—a so-called vinegaroon (*Theliphonus caudatus*) and a very interesting ant-annihilator, the *Galeodes araneoides* (belonging to the family of Solpugids).



A NEW TEXAS ANT KILLER
(GALEODES ARANEOIDES)
(Natural size.)

It is interesting to note how these specimens came to my observation. Both were sent to me by friends and both insects were alive. The Galeodes was sent to "The San Antonio Daily Express," when it was referred to me for identification. It is a rare and, I believe, hardly known insect in Texas and other American states, and its life history is but little known and therefore the more interesting to give it a little closer attention in THE GUIDE TO NATURE. It was sent from a small Texas country town near San Antonio and was accompanied with the following letter:

"I am sending you under separate cover a bug that will eat the big red ants, and I want you to find out what kind of a bug it is. I found it in the ants' nest just killing them and eating them about a week ago, and I kept him in a box ever since. I turn him loose once a day in the ants' nest to have his meal."

I had fully identified the insect and also prepared some photographic views of this ant scavenger with all the "paraphernalia" sent with it in the box mentioned, consisting entirely of ant remnants and some earthly remnants of an ant hole. The animal was still alive, and the first impression it made was the resemblance to some tarantula spider or a young vinegaroon, but it belongs to a rare class of tropical insects (Solpugids) heretofore unknown in Texas, so far as I am aware.

These are the observations one authority mentions of its life habits:

"A recent traveler in Palestine relates that when living in tents on the plains of the Jordan, near Jericho, each night, as nearly as possible between 9:30 and 10:00 o'clock, several Solpugids entered the tent room, running and racing with great speed over everything—tables, chairs and beds—just like mad creatures but apparently with no definite object, perhaps only attracted by the lights burning in the tent. When disturbed in their diurnal hiding places they showed fight and were extremely pugnacious, but their being venomous is doubtful, though the Arabs seemed to dread them quite as much as they dreaded the scorpions which were also very numerous under the large stones lying around."

In viewing the cutting apparatus of our specimen closer it was at once apparent how this ant killer disposes of its victims (remnants of which and the insect itself are seen on the photograph in about natural size.)

Its main characteristic anatomy are the head and mouth parts, consisting of a rather small head with two small glittering eyes and two very large and powerful cutting fangs of which the upper fang of the falx is not movable, but the lower one is movable by the aid of a strong joint, and it serves to grab its victims. This lower movable joint is a regular "saw-machine," being supplied like an ant with several protruding and blunt, serrated teeth at its inner curved margin.

The second specimen, a vinegaroon, was handed me by a relative and railroader of the Southern Pacific track. It was a fine, big and horrid looking fellow and very lively—incarcerated in a large, wide-mouthed bottle It was captured alive in a Texas frontier town where they are indigenous to certain favorable, mostly sandy and rocky regions. In Mexico and other tropical countries they are reported very numerous. It is noted for its immense and curved frontal fangs, supplied with several extra movable claws, and its peculiar, vinegar-like exhalations when annoyed. As to its poisonous character,



A VINEGAROON *(THELIPHONUS CAUDATUS)* KILLING COCKROACHES.
(Natural size.)

there exist different and conflicting opinions among the laity as well as professionals, but several authentic statements to the writer make them appear very dangerous and they are certainly very repugnant and dreaded like a rattlesnake in regions where they abound. Cases of death have been reported now and then, but generally they inflict a lacerated wound which is infected by some peculiar, poisonous secretion, causing local gangrene, and not seldom general blood poisoning sets in. A case was reported to this writer in which part of the hand had to be amputated from the bite of an infuriated vinegaroon. In the inland, inhabited regions of Texas, they are unknown; but in some border towns and in Mexico they inhabit the peculiar, adobe soil and old, abandoned buildings, and they are occasionally, but rarely, carried accidentally to inland towns on loads of wood, timber or charcoal, etc., similar to the fate of scorpions, tarantulas, centipedes, etc., and then occasionally become objects of great interest to naturalists or to the alcohol bottle of a drug store.

The vinegaroon under question was a well preserved, unusually large and alive specimen, and one of those dreaded fellows of the Arachnida family, nowadays exceedingly rare in Western Texas. When the specimen was handed to me, I was anxious to note how they kill their victims. A mouse or some other small quadruped was not at hand and so several alive cockroaches were put in the bottle containing the prisoner. Hardly had this been done when the roaches became terribly alarmed, running like mad around the bottom and wall of the glass, and it lasted but a few moments when the vinegaroon made a sudden dash, embraced its victim with its fearful claws and pulled it to its mouth parts when its body juice was extracted. After mutilating and dividing parts of the roaches' anatomy, leaving only two alive cockroaches (one in its embrace), chloroform was dropped in the bottle and its contents removed. In this state the photograph in this issue was prepared by the writer whilst the animal still was alive and held its victim in firm embrace—as seen on the photograph. When the roaches were put in the bottle, I may add, the "flight and fight" were witnessed by a number of interested friends and by Mr. P. G. Lucas of San Antonio (who is also a subscriber and a great admirer of THE GUIDE TO NATURE).

POPULAR ASTRONOMY.

THE HEAVENS IN DECEMBER.

BY GARRETT P. SERVISS, BROOKLYN, N. Y.

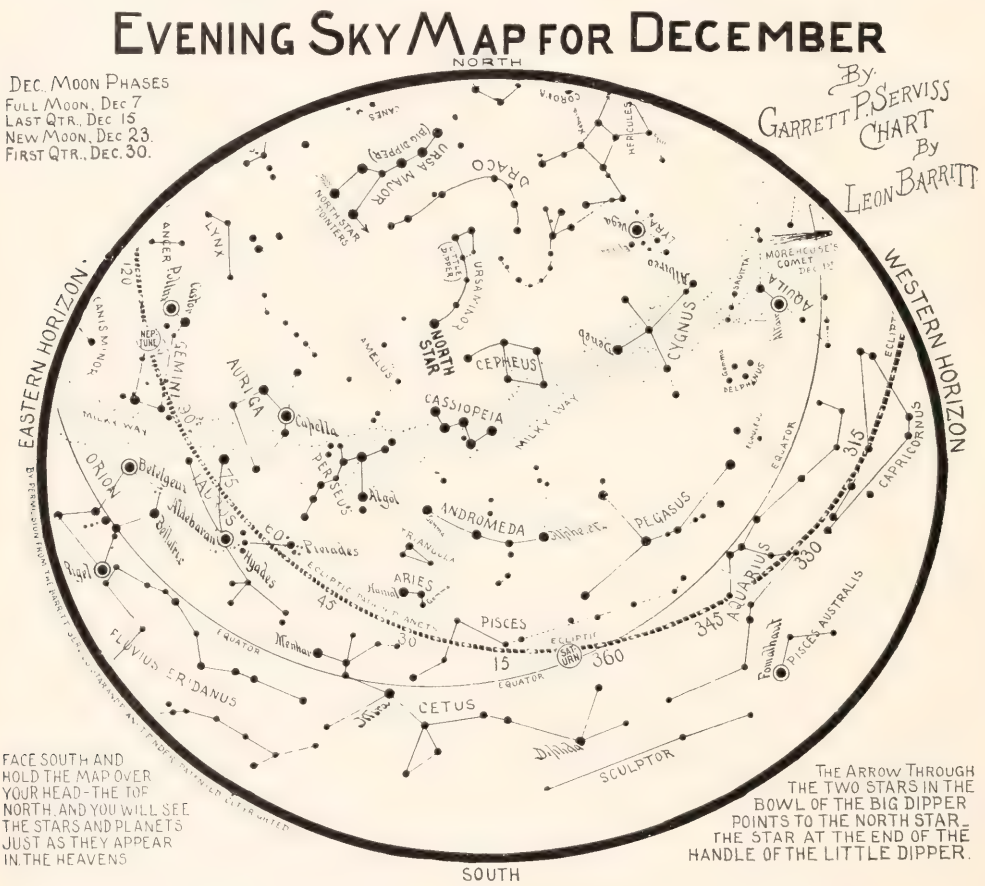
Saturn remains the only conspicuous planet in the evening sky, for Neptune, which rises about six p. m. in the middle of the month, is invisible to the naked eye. Saturn sets about midnight in mid-December, and all through the early evening hours its steady light may be seen, placidly outshining the fixed stars in its neighborhood, although it is not as bright as it appears when the rings are widely opened and when their broad surfaces add their reflection to the luminosity of the ball of the planet. It is interesting to remark, that Saturn is now close to the Vernal Equinox and consequently near one of the crossing points of the equator and ecliptic. The sun is at that point about the 22nd of March every year. Although the rings are not widely opened they can easily be seen with a small telescope, say of three inches aperture, and the spectacle that they present is one of the most charming that the heavens afford. Ever since their discovery the rings of Saturn have excited the curiosity not only of astronomers, but of all intelligent people. One of the best stories about Sir William Herschel is that of the image of Saturn and its rings which he cut out of white pasteboard and fastened on a dark wall at the bottom of his garden to show to the king through his telescope, his majesty having come for a look through the instrument on a cloudy night, and Herschel being unwilling that he should go away without seeing anything. On account of the recent remarkable discovery of a new ring in the Saturnian system it may be interesting to recall briefly what is known about these wonderful objects. There are three principal rings, two bright and one dusky. The latter, which is the nearest to the planet, is usually called the Crape Ring. It is so gauze-like in structure that the ball of the planet can be seen through it. The two bright rings are unequal in brilliancy as well as in width. The outermost, which is called by astronomers Ring A, is, in round numbers, 10,000 miles broad. It is separated by a gap 1,600 miles across, called the Cassini division, from Ring B, which is about 12,500 miles broad. The inner edge of Ring B blends gradually into the dusky Crape Ring, which is called Ring C. This is about 10,000 miles broad, and between its inner edge and the equator of the planet is a space 8,000 or 9,000 miles across. Notwithstanding their enormous size—A is 168,000 miles in diameter—the rings are only 100 miles thick. They might be likened to a gigantic buzz saw, only broad and very thin, having a wide circular opening in the centre in the middle of which hangs the ball of the planet, itself about 75,000 miles in diameter. The outer ring, A, has a narrow division near its outer edge which can be seen like a thin black line with a powerful telescope, and in October this year, at the Geneva Observatory, a fourth ring was detected quite outside of A. This new ring resembles the Crape Ring, being dusky and gauze-like in appearance. This fact is of immense importance because it tends to support the theory that Saturn's rings are gradually disintegrative. It is known both from mathematical reasoning, and from spectroscopic evidence, that the rings are not solid bodies, but are composed of multitudes of particles, revolving independently of one another, except probably for mutual collisions, and all travelling

the same way round the planet. It is probable that the Crape Ring was formed by particles escaping from Ring B and moving in toward the planet, while the new gauze ring is no doubt due to particles that have moved outward from Ring A. In the course of ages the rings may entirely disappear, a part of their substance being precipitated upon the planet, while the remainder will move outward to be eventually aggregated into satellites, of which Saturn already possesses ten.

I have already mentioned the fact that Neptune is an evening star, rising with the constellation Gemini about 6 o'clock in the evening. Jupiter, in Leo, rises about midnight on the 1st, and about 10 p. m. on the 31st. The other planets, Mercury, Venus, Mars and Uranus are all in the morning sky.

THE STARS AND CONSTELLATIONS.

The map is set for 9 p. m. on December 1st and 7 p. m. on December 31st. The first object to strike the eye of the



Both on account of the unique and charming spectacle which they afford and on account of the interesting problems which they present, Saturn's rings are well worth an effort on the part of everybody to see them, at least once, with a good telescope. The heavens have nothing to show which is at the same time more wonderful and more beautiful.

observer who has a clear horizon are the constellations that form the glory of the winter skies, now rising in the east. First comes Taurus, the Bull, carrying the beautiful Pleiades on his flank and the Hyades, with the red first magnitude star Aldebaran, on his head. Then follows the matchless Orion, with his two great first magnitude stars Rigel and Betelgeuse, and

his flaming belt, composed of three bright second magnitude stars in a short row. Just on the edge of the eastern horizon the king of the stars, Sirius, is seen blazing and flickering with prismatic hues. Above Taurus shines the bright Capella in Auriga, a star fully the equal of the great brilliants of Orion, and east of Capella may be seen Gemini with its twin stars Castor and Pollux. Near the horizon, east of Gemini and north of Sirius shines the first magnitude star Procyon. If, as is usually done, we count both Castor and Pollux as first magnitude stars, then this remarkable group of constellations contains eight stars belonging to the first rank, and several of the second. On a clear evening the spectacle that they offer is a most imposing one for any contemplative onlooker. All of these stars are immensely larger than our sun, and two of them —Rigel and Betelgeuse—are probably thousands of times more luminous than our great god of day. The wonder is increased by the fact that Betelgeuse is variable, being sometimes twice as bright as it is other times. Its changes are slow and irregular, and at present it is in one of its brilliant moods, fully equalling if not exceeding Rigel, from which it differs in color. Full in the south, and covering a vast space, is the great constellation Cetus, the Whale, whose most remarkable star Mira, a wonderful variable, is now sinking in brightness, and in a few months will be invisible to the naked eye, only to brighten again next year. North of Cetus, and close to the meridian, we see the little constellation Aries, the leader of the zodiac. North of Aries, stretching east and west, appear Andromeda and Perseus, the head of the former touching the northeastern corner of the great square of Pegasus, nearly under which shines Saturn. Between Andromeda and the Pole star is the zigzag of Cassiopeia. Away over in the west, sinking with a bright part of the Milky Way, appears the Northern Cross in Cygnus. Below the Cross, toward the north, glitters the brilliant Vega in Lyra. The Great Dipper in Ursa Major is under the pole in the north. The Little Dipper hangs bowl downward, its handle pinned by the Pole Star at the upper end. Far down in the southwest the lone Fomalhaut, in the Southern Fish, flames upon the horizon, sinking from sight as Sirius in the opposite quarter rises higher and glows more brilliantly.

December is one of the richest months in the number of its meteor showers, although it possesses none comparable with the great showers of August and November. The brightest occur on the nights from the 10th to the 12th, inclusive, the radiant point being near the heads of the twins in Gemini. These meteors are swift in their movements and have short tracks. On the night of the 25th there are usually to be seen meteors, radiating from a point somewhat further west, which are remarkable for their slow deliberate motion.

There will be a central eclipse of the sun, the third solar eclipse of the year, on December 22-23, but it will not be visible in the United States. The astronomical winter begins on the 22nd, when the north pole has already been buried for nearly three months in night.

The latest ephemeris of Morehouse's comet, indicates that it will be in perihelion on Christmas day. It was at its brightest in October when it was passing south between the Northern Cross and Lyra. This comet is a small telescopic object, whose tail has undergone some remarkable changes, entirely invisible with the naked eye.



VISITING A FISH HATCHERY.

This last summer I spent a few days at Cold Spring Harbor, Long Island, and devoted a part of my time there to wandering around the ground and in the hatchery of the Forest, Fish and Game Commission of the state of New York. I can think of no better place for a naturalist to spend a few hours than in watching the work of a large fish hatchery. Having my camera with me I took several photographs, originally as personal souvenirs, but they seem to me to have a general interest,



THE LABORATORY AND FISH POOLS.



A SCHOOL OF TROUT ASSEMBLED FOR DINNER.



"THE STRUGGLE FOR EXISTENCE" IN VYING FOR CHOPPED MEAT.

and therefore I publish them in THE GUIDE TO NATURE for the benefit of other naturalists.

The view of the grounds with the main building in the back ground shows very nicely. Several very interesting specimens of the lotus were in bloom in the tubs shown at the right in the illustration.

I attempted to take some photographs of the fish feeding. The assistant very kindly brought forth a pile of fine chopped meat, and tossed bits into the water in the place where I could best set the focus of my camera. It was very interesting to watch them when he rapped on the pan as one might do to call chickens. They evidently knew wholly by sight that there was food in the dish for them. It was impossible to get a photograph giving any detail of the individual fish. It was a wonder to me that they did not kill each other and perhaps they did inflict injury upon a few, for I noticed here and there after the feeding, two or three floating back downwards, but the keeper informed me that they would "come to" a little later, that they were probably only momentarily stunned.

In addition to this series of pools in the open ground near the main building there was a series in a most picturesque location farther up the stream. These were covered with wire netting, lifting up by a cord and pulley arrangement so as to balance in any position. These coverings were to prevent the deprivations by the kingfishers.



THE CURVES OF BUBBLES MADE BY THE SWIRL OF TROUT.



A SERIES IN PICTURESQUE LOCATION FARTHER UP THE STREAM.

This station was established nearly thirty years ago for the purpose of increasing the marine fishes and other objects of fishery, and it has been very successful. Besides hatching a very large number of eggs of brook trout, rainbow, lake trout and other fish well known to the angler, it handles an enormous number of smelt, tomcod, flat-fish, cod, blue crab and lobster. The output of the station is steadily increasing from year to year, and it now amounts to more than 175,000,000.

STUDYING THE WARBLER IN WINTER.

BY EDMUND J. SAWYER, LINCKLAEN CENTER, N. Y.

At least one article on the warbler has already appeared in this magazine; but as long as even a few readers remain who have not made personal acquaintance with these charming birds, too emphatic an invitation to observe them can hardly be spoken or written.

According to the popular notion, bird study should begin when the species are least abundant. Ordinarily this may be taken to mean in the winter. On this plan conditions are now ideal for the novice who would know the warblers. The myrtle warbler, also called the yellow-rumped warbler, one of the most beautiful of the whole tribe, is the only winter representative of this family.

The winter plumage of the myrtle is fortunately much like its rich summer dress, the chief difference being that the upper parts are now brownish instead of bluish gray. The crown, rump and sides are yellow; breast, black; belly and flanks, white streaked with black; wings and tail, black marked with white bars and spots respectively; head and back, streaked with black; cheeks, black; throat, white. The bird is about five and one half inches long, the usual warbler

size. Look for it where myrtle bushes or bayberry bushes grow. In localities where these berries are abundant they almost or wholly support the birds in winter although sumach and other wild berries are also eaten. When to be had, insects and their larvae vary the diet.

In northern New Jersey, yellow-rumped warblers came about my window with other small winter birds. Towards spring, but long before the snow had gone, I found them among the tall weeds and in bushy growths beside the road, their haunts thus being like those of the juncos' with which they associated.



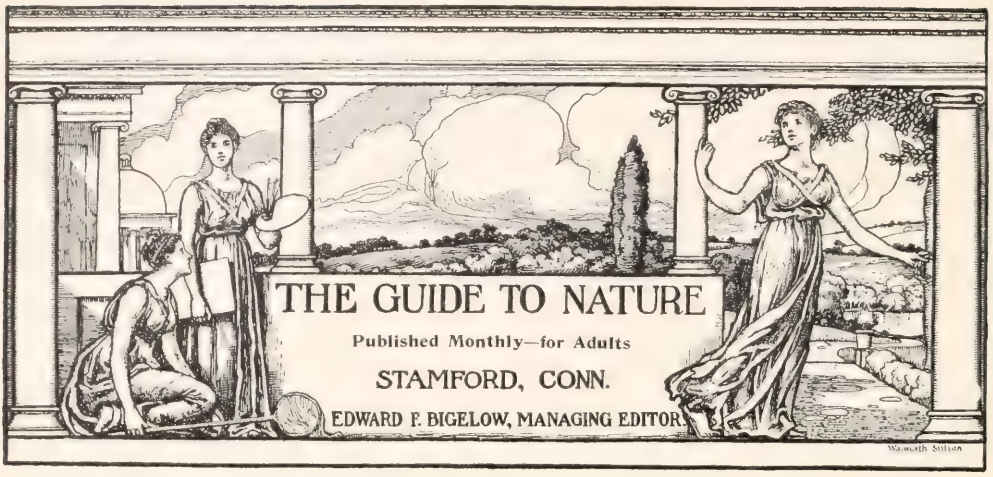
MYRTLE WARBLER.
(Yellow-rumped warbler.)

Like so many other warblers, the myrtles range during the breeding season from the northern edge of the United States into Canada. Our whole group is called American wood warblers to distinguish them from the European warblers which are entirely different. The haunts chosen by many species are decidedly forest-like, although in many instances the trees are much too scanty to deserve that name. The Maryland yellow-throat and the black and white warbler here shown exemplify the varying habits of the family. The former is a shy bird which seeks low, bushy growths while the latter is a tree creeping species of the forest.

You should have no difficulty now in identifying the myrtle warbler. Follow him about; see what food he eats and what he avoids; note his various poses and manner of flight and you will ever after know at a glance a warbler of the usual type. You will be prepared for the coming in April and May of the rest of the warbler family, than which few events in the bird lover's calendar excel in pleasure and interest.

THE ROBIN AS A NEST BUILDER.

Apropos of the paragraph copied last week from the Lambertville Beacon, which told of the theft of several lace collars by robins, we may here mention the fact that Mrs. Elmira S. Deats, who died on May 9 of this year at the home of her son, H. E. Deats, at Flemington Junction, was a great lover of birds—robin redbreast being, perhaps, the subject of her especial admiration. She had at times lost strips of lace from the lawn where they had been spread, and she knew that the robins had taken them for nest building purposes. Realizing that the little rascals needed something of the nature of strings for nest building, Mrs. Deats years ago hit upon the plan of saving all the bits of otherwise useless cord that came around packages from the stores. Upon the coming of the robins in the glorious springtime she would scatter quantities of the cord about the dooryard, and the robins would immediately pounce upon it. It was great fun to see them scrapping over a particular piece of string, and her grandchildren found diversion in watching them from the windows in inclement weather. Mrs. Deats set an example in charity and kindness that might be emulated by others; and if birds could express gratitude in words the robins would sing a song of joy o'er the mound beneath which sleeps their thoughtful benefactress.—The Democrat-Advertiser, Flemington, N. J.



"Study nature, not books."

Write articles from your observations, not from what you have read or some one has told you.

Are you a warm weather, fair weather naturalist? This month and a few following will give the answer.

IF IT IS, IT ISN'T.

In a city where there is no teaching of nature in the public schools, I recently inquired of the superintendent (who, by the way, is personally interested in nature) why he did not have nature study taught regularly.

"Because I am a naturalist, like you," he replied.

"What!" I exclaimed. "You don't teach nature because you are personally interested in it. How's that?"

"Well, you see, it comes about in this way. If I require it, on certain time and schedules, it is so perfunctory and heartless that it isn't nature, for it becomes sacrilegious. If I do not require it, there is, as the slang expression puts it, 'nothin' doin'."

"Oh, I see." But I didn't at the time —only partly. But the more I have thought of it since, the more I appreciate that superintendent as a naturalist.

If it is, it isn't; if it isn't, it is—and there you are. Reminds me of the mythical man who didn't shingle his house. Upon inquiry he explained:

"When it is fair weather, I don't need to, when it rains, I can't."

And—there you are again! What shall the poor man do?

Which poor man? Which is the man to be pitied? The householder or the superintendent? Either. Both. Who will solve the problem?

HE WAS SURPRISED.

In Brooklyn, New York, under the auspices of the New York Board of Education, I recently delivered a course of three lectures, with the general title of "Nature Study." The attendance was fairly good, but surely no more and perhaps not quite so great as I had expected.

But the local superintendent was delighted, for it exceeded his expectations At the close of the third lecture he thought to please me and to say some encouraging words, so he told me how pleased he had been by the size of the audience.

"I'll confidentially confess," he said, "that when I saw the announcement, 'Nature Study,' I was worried for fear this center would 'go down' for three weeks. Most persons have no interest in bugs and snakes and I have been surprised to observe you haven't said much about the disagreeable things!"

I'll confess to you, fellow naturalist, as you perhaps surmise, that I might have said some things along the lines of entomology and herpetology that

wouldn't have been wholly disagreeable.

But the point that interested me was his notion of what comprises "nature study," and I have wondered as to just how well he voiced public opinion in his estimation of "those things."

To a real nature lover, snakes and insects are of interest and are not disagreeable. But it must be admitted that to the "general public," they are not attractive.

Now, the point is, who has been responsible for a certain setting aside, notable occasionally, as conspicuous synonyms of nature study,—nebulæ, planets, sunrises, sunsets, landscapes, trees, mountains, rivers, indeed all that there is beautiful and interesting in this wonderful world—and substituted the minutiæ of the disagreeable?

"JUST SUPPOSE."

That is what I recently overheard the children say as they were playing in the next room at what I think was a new kind of imaginative game.

So I will take the cue and do as they do—"just suppose."

"Just suppose" we could show all invalids the advantages of nature's sanatorium ——

"Just suppose" that all the imaginative and fictional statements about nature have been turned into real seeing and discovery ——

"Just suppose" one could go to a news stand and pick up magazines or newspapers telling of the real and not of the fictitious ——

"Just suppose" that the money spent on even one ball game could be applied toward showing people a better form of recreation in a life out of doors ——

"Just suppose" that we could divert all trivial gossip about other people into talk about the superabundance of beauty and grace in the nature surrounding us ——

"Just suppose" it could be proved to the general mind that a naturalist is one who tries in every possible way to be benefitted by the beauty and wisdom of the universe ——

"Just suppose" we could demonstrate the fact that a holiday or a vacation is better spent in the fields and woods than in the crowded, noisy, money wasting resorts ——

"Just suppose" that every preacher should stop telling, if only for a little while, of God in distant time, place and words and give us a few glimpses of his Omnipresent Works ——

"Just suppose" that all the discussing, theorizing and philosophizing about systems, schedules and values of nature study in the schoolroom have been turned into the actual introduction of young people and nature to each other ——

"Just suppose" we could induce all people with many acres of greenhouses and many men to attend to them, with flowers and plants more than they can even see, to realize that people not wealthy would be benefitted if shown the pleasure of growing a plant—a simple plant in a simple way ——

"Just suppose" that all the technical scientists should stop embodying minutiæ into their Reports and "Monographs of Sesquipedalian Interminable Choctaw Nomenclature" and should take a little time to tell us "common folks" in plain language about the wonders or the interesting things that they have discovered in nature ——

"Just suppose"—well, "suppose" we did so "just suppose," what would happen then ——

The millenium. An earthly paradise. Heaven begun here below. A strong, sane, healthy, happy humanity.

THE AA FIRST; AND ITS SPIRIT.

Many of our readers, in their letters reveal a misunderstanding of the relative position of THE GUIDE TO NATURE and The Agassiz Association. They regard the magazine as of the chief importance as a new and much needed business venture or as a new move in the advancement of nature study in schools. Both points of view are wrong. The AA is first of all. It is the oldest and most efficient organization in existence for the study of nature and for fostering a love of nature. It was organized in 1875, and incorporated in 1892 with an endowment of

five thousand dollars. The continuance of the AA depends on the membership fees. This has been repeatedly explained in THE GUIDE TO NATURE and elsewhere. Full particulars are contained in "Three Kingdoms" (mailed postpaid for seventy-five cents) and in the AA Manual (mailed for ten cents).

The AA in its thirty years' existence has had various methods for the interchange of observations, the outlining its work, the disseminating its ideas, etc. THE GUIDE TO NATURE is only one of many methods—the latest and perhaps in some respects the best.

But however good this may be we assure our friends that we do not want their support and interest to be placed principally and primarily there. Placing the interests of THE GUIDE TO NATURE before those of the AA, is colloquially and ludicrously expressed, by the old story in which the tail wagged the dog. Or, to change the figure to one more in harmony with our work, how absurd it would be to attempt to care for the bloom or for the terminal bud of a plant and make no provision for the roots!

In a general magazine or in a book published for profit by a business company or corporation, the interest is chiefly in the goods supplied in exchange for the money. A reader seldom if ever thinks of the publishers. That general habit is one of the worst obstacles encountered in our work. Many of our readers insist, as with other books or magazines, in putting THE GUIDE TO NATURE first. But the magazine is only one of many tools. Do not forget the personage (the AA) that is using that tool. We plead with you to place your interest primarily where it should be; that is, with the AA. If you have a general love for nature and of outdoor life, come with us and be one of us. Aid this great organization that extends around the world to keep efficiently to its high ideals and extensive work. It is encouraging, so far as it goes, to receive enthusiastic letters about THE GUIDE TO NATURE, promises of articles, promises of subscriptions and the need of such a new venture. But the venture isn't new. It is a third of a century old and this is only one of its many steps of advancement. Go to the heart of things, get to the nucleus,—take an active interest in the AA.

We are not one-hundredth part so desirous to receive elaborately written and illustrated articles for THE GUIDE TO NATURE, "just to help along the new venture," as we are to start more persons on the road toward the making of original discoveries in nature.

Here is the kind of letter that we do not want:

"Enclosed are manuscript and illustrations which I prepared for one of the large general magazines and for which I could probably get fifty dollars or so. I am interested in your new venture and to help it along will let you have them at somewhat of a discount from regular price."

Here is the kind of letter that we do want:

"I have been studying —— for several years and enclose herewith an account of some of my observations which please publish for the benefit of my fellow students in the same subject. I desire to continue my study of these and other departments of nature and recognize that the AA will help me. I enclose $— for —— Membership which I understand includes the various aids by which the organization is helpful to its members."

It is letters of that type and spirit that enable the AA and all its methods to increase in value and in beneficial results.

The AA is not money making and I desire that none of the letters that come to my desk shall be written in a financial spirit. My friends, the members of my family, the members of the Council, the members of the AA, and the editor, willingly and gladly devote time and money for the good of the cause and to encourage and stimulate the study and a love of nature. The president and editor, they are one and the same, receives no salary nor any pecuniary remuneration directly or indirectly for the presidency of the AA nor for the editorship of THE GUIDE TO NATURE, and once for all let it be an official "proclamation" that he does not desire that letters shall come to this desk which in spirit want to know "How many $ $ $ $ $ $ $ in it for me?"

I have very few of these $ $ $ $ $ $ $; nevertheless I am willing to devote $ $ $ $ $ producing time to this work, and members of my family and my scientific friends are aiding me in this—from this same spirit. I cordially invite you to come in on the same basis. I am willing to go with ten million, with ten or, if others desert, with none. But I shall go—so long as I live.

Will you go with me?

In thorough earnestness, yours for the love and study of nature through the AA,

Cordially,

EDWARD F. BIGELOW.

CORRESPONDENCE AND INFORMATION

A QUERY AS TO COLEUS LEAVES.

Tacoma Park, Washington, D. C.

TO THE EDITOR:—

It seemed a pity to lose the beautiful large leaves that I stripped from some coleus cuttings, so I arranged them in two shallow boxes of sand to form a kind of mosaic, with the stems covered, and placed them on a porch where they got the morning sun. After moistening the sand and sprinkling the leaves, I inverted over them an old glass fish-tank. I sprinkled the leaves daily, perhaps for two months during which time they kept their beautiful variegated colors, and were evidently "very much alive," but there was no appreciable growth above ground.

Suddenly, one night, there was a heavy freeze, and all the leaves wilted, with the exception of one silver-spotted leaf—I think a begonia. Pulling some of the leaves up, I found them richly supplied with rootlets, as much as four inches long.

Now the question arises—and I will try to answer it by experimenting with a new "batch,"—What would those leaves have done had they not been frosted? There seems to be no attempt to start a new stem. Would the leaves have continued indefinitely without growth, the growth all going to root, or would the plants—after having formed a heavy root system, have forced a new stem and grown a regular plant, or would they have finally lapsed through the "statute of limitations?"

I notice that these leaves continued in service longer than similar leaves on my growing plants. Is it because nature recognized that it was a "Hobson's choice," and so kept the leaf at work "overtime" because it was the last and only chance?

Very sincerely yours,

G. H. HEALD.

A SHOWER OF CATERPILLARS.

Soulsbyville, Cal.

TO THE EDITOR:—

A short time ago I had the novel experience of being out in a shower of caterpillars. I was walking down a railway cut, on the pursuit of entomological specimens intent, when the refreshing silence of the morning was broken by the roar and shake of a blast, set by a Japanese section gang, a short distance back. Then, for a few seconds, the air seemed full of falling caterpillars. I was, literally, covered with them, as was the ground around. After alighting, they began to climb up the sides of the cut to the overhanging figwort bushes there, on which, presumably, they had been feeding until frightened by the reverberation of the blast, when they dropped, thus causing the deluge.

The caterpillars were about an inch long, covered with branching yellow and black spines. They had three longitudinal yellow stripes, one on the middle of the back and one on each side, the remainder of the body being purplish black. After removing the "shower drops" from my garments, I gathered some to raise at home. Afterwards, the nearest identification of the caterpillars that I could determine, was that they were, probably, of the Melitæa butterfly family. (Melitæa macglashani.)

Yours very truly,
W. Thomas Ham.

ARTHRARIA.

Franklin, Pa.

To The Editor:—

For a number of years scientists have known of a curious fossil found in a hard layer of river shale, and



THE CURIOUS FOSSIL IN THE RIVER SHALE.

which has somewhat the appearance of a double cross; that is, it consists of a flattened central body, one eighth to one fourth of an inch in thickness, and usually about three eighths of an inch wide, and having a thickened enlargement at both ends, which projects on each side like the arms of a cross, or which in some specimens resembles an arrow head.

It has been named Arthraria; meaning a joint; but so far nothing definite is known of its character.

While many specimens are often found in one small piece of rock, they are almost always quite disconnected; but the writer, who has for many years been much interested in the organism, and has examined hundreds of examples of it, recently found one attached to what seemed to be a portion of a stem, as shown in the illustration, where the fossil has had the cross head broken from one end.

It has been suggested that the subject might be a seed; but continued study leads to the conclusion that it is more likely to be a portion of a plant that was capable of readily separating into sections; each of which was capable, under favorable conditions of continuing a separate existence.

If this is true, the scar shown on the enlarged end of the specimen is probably the point from which either a root or a branch was emitted.

This contribution is published to supply additional material for the study of this refractory fossil, and to aid, if possible, its final determination.

W. T. Bell.

AN ASTONISHING HUNTING STORY.

Margaretville, New York.

To The Editor:—

Hunters in the woods have some peculiar experiences and can often relate true tales that would make even the so-called nature fakirs open their eyes in astonishment.

Probably one of the most unusual experiences that has ever come to a hunter in this section fell to the lot of Harry Brown, son of W. H. Brown of Allison & Brown of this village a few days ago. The young man was hunting squirrels in Canada Hollow, a region some ten miles from the village and noted for hordes of gray squirrels that inhabit it. He had been in the woods for some time, had not seen much game, and was becoming discouraged when he heard the bark of a gray squirrel. Thinking to be sure of his game, he approached very quietly

in the direction of the noise and arriving in sight of a big oak tree saw the squirrel perched on a topmost limb and scolding and barking hard. There was nothing unusual in this, but as he was about ready to shoot, what was the boy's surprise to see a large red fox directly under the tree and watching the squirrel with all its attention.

The boy was so intent on the squirrel that he had started out to shoot that it never occurred to him in the excitement to shoot the fox first and he fired at the squirrel. The animal fell immediately. The fox never stirred until the squirrel struck the ground when he grabbed it and started to run. Young Brown by this time had his wits about him and having put another shell in his gun fired at the fox which dropped in its tracks with the squirrel still in its mouth.

Whether the psychology of the story is that like attention on the part of both the boy and the fox led them to fix all their minds on the squirrel and thus be forgetful of the other or whether there is some other explanation I am unable to say.

CLARKE A. SANFORD.
Editor "*The Catskill Mountain News.*"

A DEFENSE OF ONE GROUP OF CAT HATERS.

New York.

TO THE EDITOR:—

In an article in your September number Mr. C. H. Jones devotes a paragraph to the "Cat Hater" which seems rather unfair in the light of certain known facts. I may state that while I am not "crazy" about cats, I would claim a place midway beween the "Cat Lovers" and "Likers." But I know a number of people and am constantly meeting others who would be classified as "Cat Haters" by Mr. Jones, and I wish to make the following statements concerning them; statements which have long been known to medical men, but which are still unexplained.

With these people the feeling in regard to cats is actually that of fear or blind terror. This is congenital and not originated by induced fear on the part of nurses or otherwise. As infants, these people had the same terror of a piece of cotton or a muff. As adults, the feeling is entirely distinct from fear of any other thing or organism. Coexistent with it there may be perfect fearlessness of dogs, rats, mice, worms, snakes and other creatures, and I have known such people to be particularly fond of watching live lions and tigers. The fear is usually greater of a kitten, perhaps because at this age its movements are more uncertain. But the tiniest and most helpless kitten may cause as great a manifestation of terror as the largest and most aggressive 'Tommy.'

The fear cannot be put into words except that it is an innate horror of being approached or touched by a cat. Cats seem to have an instinctive desire to go to such people and I have frequently known a cat to follow them for many blocks. No amount of reasoning or association with cats can overcome this feeling, as indeed we realize must be the case with a congenital characteristic.

Finally, and most remarkable of all, these people have the power of knowing when a cat enters the room while the animal is yet invisible to them. It is Dr. Weir Mitchell, I think, who attributes this to an unusual sensitiveness on the part of the person's sense of smell to some faint odor emanating from the cat. I know of no one of the ordinary and senseless dislikes of mice, bats, snakes, or other innocuous creatures, which is congenital and which cannot be overcome by the will of the person. Without exception all these seem to be induced during early childhood.

This defense of at least one group of "Cat Haters" is offered as a most interesting subject, the explanation of which may one day be forthcoming or it may be forever buried in the dim past history of the evolution of the human race.

C. WILLIAM BEEBE,
Curator of Ornithology,
New York Zoological Park.

TREES AND WOODPECKERS.

473 Madison Street, Brooklyn, N. Y

TO THE EDITOR:—

Are trees injured by the holes made in the trunks by sapsuckers?

Do sapsuckers ever drink water or bathe?

Do other woodpeckers drink water and bathe?

MRS. C. S. HARTWELL.

LICHENS.

By Frederick Le Roy Sargent, Cambridge, Mass.

A leaf-forsaken twig they beautify,
And o'er a ledge's harsh and frowning face
A smiling silken mask they softly place;
Upon a barren hillside, hot and dry,
Their mimic coral-reefs contented lie;
Or close beside a dead tree's shattered base
They lay, for lachrymal, grief's choicest vase
Imploring pity from the passer-by.
Yet look not for them in the verdant field
Or blossoming copse amid the rose's court
Of beauteous pleasurelings; their livery
Is consecrate to want, 'tis of a somber sort
Befitting toil, and is the safer shield
Defending them as doth humility.

AUTUMN LEAVES.

"The leaves fell brown and dead upon the streams
And in the many winding woodland-ways.
And the blue haze again upon the hills
And o'er the sleeping waters spread its veil
All faint and dim, and from the misty deep
Of the great stream was heard the lonely cry
Of the solitary loon that lingered still upon its bosom."

HOWARD WORCESTER GILBERT.

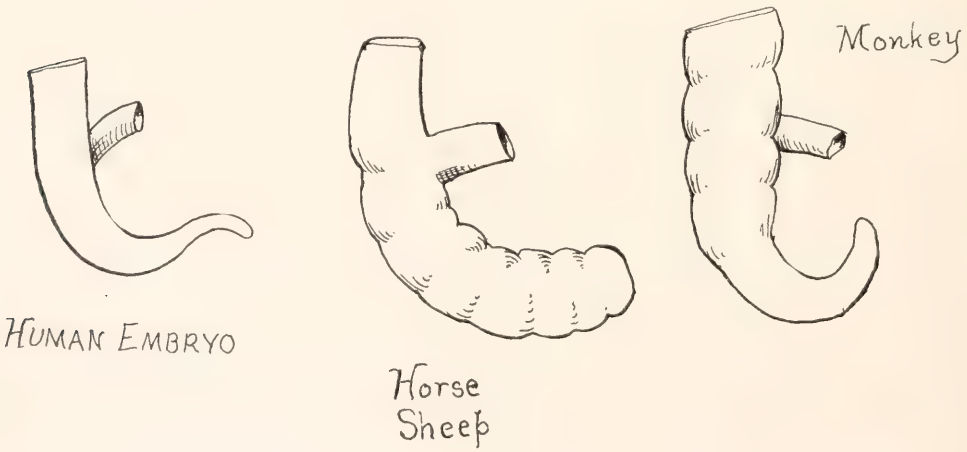
The commonplace is the grandest of all things that the exceptional in any line is no finer, better, or more beautiful than the usual, and that what is really wanting is not that we should possess something we have not at present, but that our eyes should be opened to see and our hearts to feel what we all have.—Dr. R. H. Bucke, "Walt Whitman."

PHYSIOLOGICAL.

THE APPENDIX.

BY DR. S. G. SHANKS, ALBANY, NEW YORK.

The small intestine or principal portion of the digestive tract empties into the large intestine (colon) at a point about four inches above the apparent beginning of the latter. This pouch or pocket, below the junction, is named the cæcum (blind sac). The appendix is developed as the terminal portion of this blind sac, so both may be more or less taken together under the term, cæcal pouch. The special portion, termed the appendix, is, in man, slender and worm-like. It is usually attached at the back and lower end of the cæcum. It commonly hangs downward but may lie around the cæcum in any direction. It may be one to six inches in length and about one quarter of an inch in diameter. To the ex-



ploring finger it feels soft, like the small intestine; but when congested or inflamed it becomes rigid or stiff. It is generally covered in front by some coils of small intestine. Anatomically its structure is like that of the large intestine—but much more glandular. The muscular walls of the appendix have been seen to contract with those of the cæcum, urged by the same nerve impulses. This contractile power explains why foreign bodies are seldom found and also why any such bodies, if in, might be expelled later with the normal mucous secretions. The cavity of the appendix almost always contains (even before birth) the usual contents of the cæcum. What is the function of the appendix? As it tends to shrink or become closed, with age, and appears to cause no disturbance to the economy when removed as a diseased organ or as a precaution against disease, we must study its development. Has it ever been useful to man?

We find the cæcal pouch is largest and best developed in herbivorous animals and birds and least developed in the flesh eaters. In the mixed feeders it is moderate in size. The herbivorous cow, sheep and deer, with complex, four-chambered stomachs, have each a large cæcal pouch. Birds have two cæcal pouches or appendices. The small intestine enters the colon between them. In the turkey these appendices are twelve or more inches long. In the fowl they are six to ten inches long. The horse family have simple stomachs and presumably less digestive capacity than the cloven hoofs. The cæcum in the horse is over three feet long and nearly a foot in diameter. The hare, rabbit and beaver have very large cæcal pouches. In fact all the hoofed animals and also the rodents have relatively large cæca, an indication that the food is coarse and difficult to digest. These large pouches act to delay the food or to provide additional secretion and a more complete digestion. The carnivora, eating more concentrated and nutritious food, have small appendices. Leopards and tigers have a short cæcal pouch with a nipple-like appendix. The bears, badgers, raccoons, bats, frogs and turtles have neither cæcal pouch nor appendix. Our poor relations, the fruit-eating monkeys, are provided with an appendix several times the relative size, compared with man. The cæcal pouch tapers into the appendix like the human embryo form. Looking into our own embryology, we find the appendix very long and clearly the tapering end of the cæcal pouch. At birth it is still long and large. The adult form is reached at about the fifth year. The appendix was carefully examined in a series of several hundred autopsies. The result showed that from fifteen years of age on, an increasing percentage of appendices were either obliterated or obstructed. At sixty years, fifty per cent of all appendices were found to be functionless. This conclusion is forced upon us. Man was formerly an herbivorous creature having a long and voluminous cæcal pouch in his pendulous abdomen, and embryology indicates that this time does not lie very far back in our history. After a time culinary skill developed and man's interest in the delights of a varied bill of fare was awakened. The more nutritious diet was appreciated by his overworked paunch. His cæcum, less needed, gradually shrunk, leaving the dwindling appendix in its present form—a slender, stunted, disappearing organ, destined to pass away when we take our merely necessary nutriment concentrated in the form of tablets and capsules. The appendix in man secretes mucus that may serve to moisten and assist the onward movement of the intestinal contents. It still has a function although the work is on a small scale.

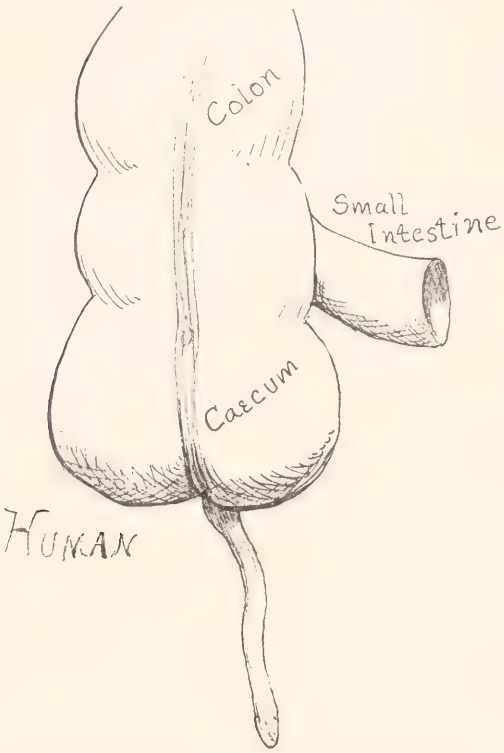
We have it on the list,
And we know it does exist,
Yet it never would be missed, by our race.

But the wise herbivorist
Has good reason to insist,
That the cæcum should persist, in his case.

A few words concerning the interesting and fashionable appendicitis. What causes it?

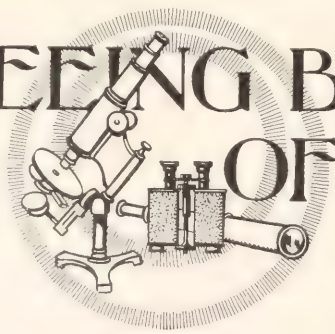
Small or smooth seeds and such solid bodies, sometimes found, probably never cause trouble. A pin or sharp

bone or fragment of glass may wound or perforate the organ. It is believed that many cases of appendicitis are,



at first, catarrhal; that is, the inflamation is limited to the mucous lining only. The organ being a lang, narrow, blind sac, mechanical conditions rather favor the stagnation of anything that may enter from the intestine. If the substance contains pus forming bacteria, an infection may follow. It has been noted that a condition of lowered vitality induced by an acute indigestion (at the head of the list), cold congestion or an injury like a blow or strain, often precedes the inflammation. Influeza, rheumatism or any other general infection may be a cause. The whole reparative power of the appendix is low, as might be expected in a retrogressing organ, consequently, microbic infection frequently occurs and slight attacks of appendicitis may be more common than is generally known. If the catarrhal inflammation is severe, congestion and swelling of the mucous membrane may be sufficient to obstruct the cavity and cut off drainage into the cæcum. Then further exudation of serum and mucus, with bacterial growth, will produce pus, distention and often a compression of the blood vessels leading to gangrene, easy perforation and blood poisoning. A previous attack of appendicitis, causing kinks or constrictions or adhesions to neighboring parts, hampering the normal contractions and the return flow, is always attended by a lowered resistance to infection and a predisposition to further attacks. There is a steadily diminishing rate of attacks after thirty years of age.

SEEING BY AID OF THE LENS

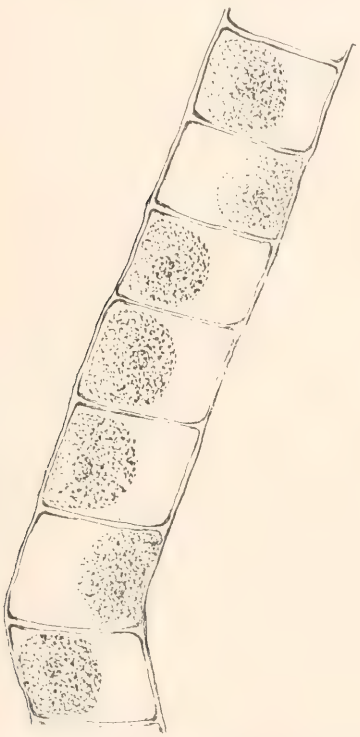


A TERRESTRIAL ALGA.

It was toward the middle of a mild November that I noticed splashes of what seemed to be a green stain, at the bases of the maples that form an avenue along a country road. The trees themselves were bearing a luxuriant growth of *Protococcus viridis,* the minute, single-celled plants concealing the bark under a sheet of green, while on the damp ground those splashes of

color were conspicuous. Yet I had passed the place perhaps a hundred times, but until that day I had not seen those verdant tinges on the earth, or had called them "young mosses," and forgotten them.

But I knew at this time, that to whatever the appearance was really due, it was not to any earthly moss, for as I lifted a dead leaf, the growths beneath stood upright in a little mat of



PART OF A SINGLE FILAMENT OF ULOTHRIX FLACCIDA, SHOWING THE MASSING OF THE CELL CONTENTS AGAINST THE CELL WALL.

microscopic velvet that was a hint as to the real character.

The plants growing at the roots of the maples in patches so luxuriant that they occupied the earth by the square foot, are not rare, yet they cannot be common. This, in connection with two delightful secrets that they later tried to reveal, makes them more attractive than ever, and their lucky finding becomes an event of importance, at least to the man that collected them by scraping the earth with a penknife. They proved to be *Ulothrix flaccida*, Kg., and showed themselves to be worthy of extended study.

They are algæ. But algæ thrive in the sea, and are tossed by the waves to the beach, where they are occasionally gathered by lovers of the beautiful in nature, but more frequently are trodden under the feet of the careless and the ignorant. So do algæ thrive in sweet water ponds and ditches where the water is quiet, and the sun shines warm and unobstructed. But while these were undoubtedly algæ, yet they were thriving on the bare earth. A fresh-water *Ulothrix* with a terrestrial habitat was worth investigating.

There are two allied algal genera, *Ulothrix* and *Conferva*. They are always difficult to separate and to identify, and are as able to make themselves troublesome to the microscopist as are some other of nature's productions. But this particular species of algal *Ulothrix* must be absolved from such microscopical sins, for, aside from its terrestrial preferences, it exhibits a feature so characteristic that it becomes diagnostic, and leads the observer at once to that resting place which the scientific name provides, and which affords him an opportunity to pursue the study, with a feeling of protection that nothing will so pleasantly impart as will the knowledge of the name. It is a comfort to know with whom one is speaking, even at a first meeting.

The peculiarity of this peculiar *Ulothrix* is that the cell-contents are habitually, and almost constantly contracted into a little hemispherical mass, and thrust against the cell-wall where it adheres with little change, unless the plant is subjected to a rather prolonged maceration in water, and sometimes even after such treatment. In a thread of the *Ulothrix* containing seventy-five cells, seventy-two were in this hemispherically contracted state, and so remained at the end of several hours' soaking. This, in connection with the general microscopic aspect of the plant, the size of the cells (from 7 to 9.5 microns in diameter), and its habitat on the damp earth will, almost

at a glance through the microscope, distinguish it from a *Conferva*, or from any of its more immediate kindred.

While making a vain search for those colorless and arborescent prolongations that, when present, act as rootlets, I happily penetrated into a secret, that for many evenings made *Ulothrix flaccida* a charming guest at the microscope table. At the lowermost end of the thread-like filaments which form these simple plants, and near which the cells had become brown, shrivelled and apparently dead, nature was in the act of producing a lichen. In one of the formative stages, and an early one at that, here was a lichen in process of development. That grey and wrinkled object which we all know by sight, and which seems to ask for nothing but a sterile rock, or a bit of dead bark in the sun, is not the single, independent growth that it appears to be, but is a combination of fungus and alga, a symbiosis in which two distinct plants give and receive a certain something, that to the one is not necessary, but to the other is essential, a result of this reciprocity being that apparently half-dead thing, which we so often reject as not worth a moment's notice. Yet it is not half dead; it is doubly alive.

It was upon the beginning of such a combination that I happened, when I found the green stain on the ground, and brought bits of it away in the palm of my hand. Here were filaments that were neither *Ulothrix* complete, nor *Protococcus* cells unaltered, for the latter were dividing, changing and developing on the ground where the rain had washed them from the tree-trunk above, and where the verdant patch was increasing with every shower. But some of the *Protococcus* cells had been caught in the embrace of a colorless thread (hypha) of a fungus, which had divided itself so that it might at once touch two surfaces of the cell, while others had twined themselves about the *Ulothrix* filaments, into several of whose cells they had penetrated, and upon whose delicate spire they were climbing. So young was the combination, that, mingled with the growth, were fungous spores that were just beginning to emit their colorless threads, and were apparently reaching out for the support and the nutriment that only Ulothrix could afford. What the lichen will become, the future alone can tell. Nature may suppress it before it attains maturity, or some more favored observer may solve the problem.

This was my first meeting with *Ulothrix flaccida*, but not the last. I next observed it on the foundation stones of my house. It appeared between the bricks in the garden walk; in a broad sheet on the surface of one of the flower beds; on the sides of a flower pot in the window; on the fence posts in the back yard, and luxuriantly in a small aquarium on my microscope table, where it still presented the characteristic massing of the chlorophyll against the cell wall. But as an aerial growth it finally became altered in an astonishing way, and revealed a part of another secret, yet with a "missing link" that I hope to find "somewhere, somehow."

In the late summer or in the early autumn, *Ulothrix* disappears from the garden beds, and its place is taken by a common moss. Is the alga a stage in the development of the moss? Do the algal filaments originate from the *Protococcus* cells, which, as is well known, have no right to separate, generic existence, but which, in this instance, become a terrestrial *Ulothrix*, and in favorable conditions, a protonema, and eventually a common moss? Where the *Ulothrix* is the moss finally appears. The inference is plain, if not convincing, but the succession is too constant to be rejected as meaningless. I have not been successful in my search for a sight of the actual changes. The links between the alga and the protonema, and between the protonema and the moss, are missing, yet I am persuaded that they exist. Perhaps some observer more favorably situated in locality and in leisure, not to say in perseverance, may solve the problem. It appears that *Ulothrix flaccida* when aquatic is an alga, and that when aerial the alga finally becomes a moss.

THE CAMERA

TWO OR MORE PHOTOGRAPHS ON ONE PLATE.

BY WILBUR F. SMITH, SOUTH NORWALK, CONNECTICUT.

Making "doubles," or two or more exposures on the same plate, is interesting, and gives play and scope to all the ingenuity that a person can command. Such "doubles" have one great advantage, since we can repeatedly photograph the same object on one plate, as I have done with my dog, for I have him in four characteristic positions, and so well has the duplicator done its work that one can easily believe the picture to be that of four dogs.

The process by which this is accomplished is shown in the picture, where the figure in the upper corner fades out to nothing, and the light overlaps from the next exposure, leaving no dividing line. The dog on the



"MY DOG AND I."

Four photographs of one dog on one plate. Observe the excellent merging of the four exposures into one photograph.

boy's shoulder overlaps the top exposure, and exemplifies one of the most difficult feats to accomplish without having the first picture show through and spoil the second. Did you ever try to photograph the same animal for four times in succession and not have him move and spoil the picture?

From this kind of work I have learned something that has a practical value and should appeal to every amateur photographer. We all have found subjects, one part of which was in shadow, the other being in bright sunlight, where an ordinary exposure would not give the desired results, and doubtless we have gone away hoping to return when the light should be right.

Look at the ravine picture in which apparently the light was uniform, as to the exposure, yet the left bank is in the shade of heavy hemlock woods, and only by a double exposure could I get satisfactory results.

I here put my slide before the lens as a duplicator, and guessing at the proper length of time, I exposed for the sunlight. Reversing the slide, I exposed for the shadow, giving the left side of the picture four times the exposure of the right. The result was an evenly exposed plate.

The principle of the duplicator brought thus into practical use, must appeal to every amateur photographer. The range is so wide, and the fun to be had, as shown in the first pictures, is so great that it is a wonder that more amateurs do not take up this fascinating sport.

AN OMITTED CREDIT.

The double photograph on the bottom of page 242 of the October number of "The Guide to Nature" was taken by Arend Dubee, Beloit, Wisconsin.

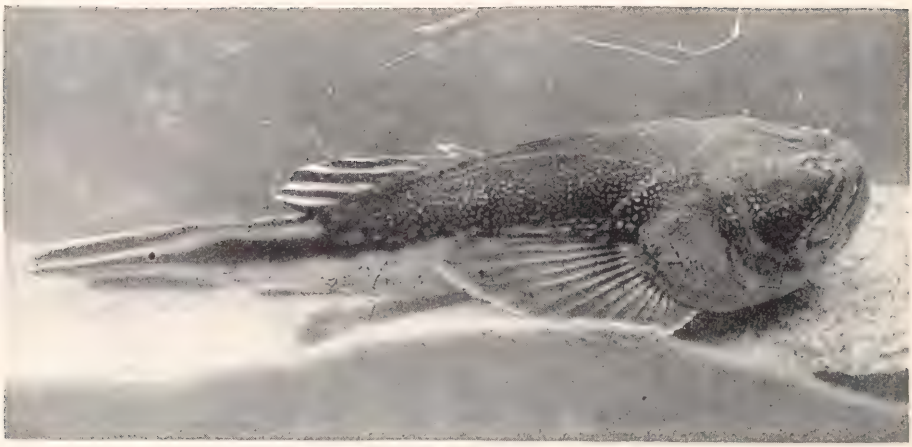


DOUBLE EXPOSURE OF AN UNEVENLY LIGHTED SCENE.

By this method, the detail of the heavily shaded portion was brought out and the well lighted part was not over exposed.



"COMING THROUGH THE RYE."
Photograph by Louis Fleckenstein.



A PHOTOGRAPH OF A STURGEON FROM LIFE.
A good example of "under water" photography by Dr. R. W. Shufeldt.

SHEEP.

BY GEO. W. KELLOGG, ROCHESTER, N. Y.

To being on a country road at the right place and at the right moment, to having a camera that can be put in action almost instantly, and to the most favorable of conditions, is due all credit for this picture. A minute before the sheep had been let out of their pasture. They had raced down the road to the watering place, and are waiting for their owner to apply



A REMARKABLE KODAK PHOTOGRAPH.
Note the excellent detail and depth of focus.
Photograph by George W. Kellogg.

his muscular energy to the pump handle in the rear. In less than a half minute the sheep were in keen competition for the first places at the watering tub. The negative was made with a folding kodak on kodak film.



HOMEWARD BOUND IN LATE NOVEMBER. Photograph by Charles Tracy.



A NOVEMBER STUDY OF SHEEP AND FIELDS.
Photograph by Miss Sarah Weaver, Plattsburg, N. Y.



WHITE CHRYSANTHEMUMS.
Photograph by Arthur Hooper.

THE AGASSIZ ASSOCIATION

AUTUMN OBSERVATIONS.

BY ELMER WALTER, CORRESPONDING MEMBER, NO. 2002, PERU, IND.

One day late in October I took a walk to the woods which is all that remains of the forest playground of my boyhood. A brook meanders across one portion and during the ages of its erosion through the clay and boulder drift, it has formed for itself a little ravine, flanked on both sides by hills that afford good burrowing places for the small animals that yet make this their home. Beneath the shading boughs of the trees are here and there groups of pawpaw bushes clumps of spice-wood, scattered wild gooseberry bushes and blackberry patches. Along the brookside is a tangled thicket of young trees, vines and weeds. On the edge of this thicket stands a grand old oak that has thus far escaped the woodman's ax and defied the lightning.

Jack Frost had painted the landscape in his masterly way. Some of the lower leaves of the beech trees were still green, but the tops were brown and others were decked in red and yellow. The sunshine sifting through, completed the color scheme and illumination. The air was cool enough to make the sunshine pleasant, and I strolled about aimlessly, sometimes lingering to eat a few ripe pawpaws, or to examine some interesting plant. I then walked to the southern border of the woods, where a tangle of grape vines formed canopies with one or two hawthorn trees and where the wild fruit was ripening under the autumn sun. Spanish-needles reached out for intimate greeting and the pappus of thistles and the comose seeds of the milkweed floating in the air, said that summer days were o'er. Up to this time I had been accompanied by the dog, "Freddie." He had killed a mole in the woods and was now searching for rabbits. At noon while I was sitting on a boulder in a sunny part of the thicket I found that "Freddie" had deserted and gone home. But I had other company. There were crows, bluejays, nuthatches, speckled and downy woodpeckers, and toward evening I saw snow-birds in a corn field—



"ON THE EASTERN RIM OF THIS THICKET STANDS A GRAND OLD OAK TREE."

another reminder of the approach of winter. I had an apple and a half dozen walnuts in my pocket. In the dry bed of the brook where cobblestones were plentiful, I cracked and ate the walnuts. Then going up the hill I sat down and ate the apple. In

a depression on the hillside only a short distance below me was a little brush-heap half buried in fallen leaves. I had heard a rustling there and soon became aware that a chipmunk (striped ground-squirrel) had there taken refuge. I threw the apple-core toward the edge of the heap. Scarcely had it fallen when "Mr." Chipmunk appeared. Pausing only for a brief glance at me, he made a quick forward and downward movement of the head, which fastened his incisors deep in the apple-core and it was carried back into the dark recesses of his abode.

I sat there for awhile, then moved to another part of the woods and later came back to the south slope of the hill. Another ground-squirrel, ran into a hollow stub of a limb on a log lying at the foot of the hill. I sat down near by and remained quiet. In a few minutes he poked his head out, but, seeing me, soon withdrew. I noticed that his cheeks were distended by something which he was carrying. Going up to the log, I took a little mirror and reflected the sunlight on him. The hollow extended only far enough to allow him to retreat for a few inches or a foot, from the entrance, so he and I were practically face to face. A bright red berry that he had dropped revealed what he was collecting. It was the fruit of the dogwood tree. At that time acorns and nuts were scarce in this part of the woods, and the little fellow had to gather such crops as nature provided. Several dogwood trees well laden with the fruit were near by. I gathered some and bit into one to examine it. The pulp is somewhat bitter, but is relished by bluebirds and robins. There is a small nutty kernel in the stony seed and this is probably the part utilized by the squirrel. Taking about a dozen of the berries, I threw them into the hollow log, just in front of him, at the same time reflecting in the sunlight. While I was there he remained crouched low, his little black eyes sparkling. I went away for a short distance and stood somewhat behind a tree. In a few minutes he came out and, after looking around for awhile, turned back and proceeded to fill his pouches with the berries. He took them all. I saw him go to his den on the hillside. I went to the dogwood tree and got another handful of berries and put them in his burrow, completely filling the entrance. In another part of the woods, I found a tree where beechnuts were plentiful. Eating what I wanted, I gathered some for the squirrel. When I returned to his burrow, about an hour after I had left it, I found that he had taken care of all dogwood berries. I then contributed a handful of beechnuts to his winter store.

LITERARY AND BIOGRAPHICAL

In The Open. Intimate Studies and Appreciations of Nature. By Stanton Davis Kirkham. San Francisco and New York: Paul Elder & Company.

The author has spent the better part of his life in the great out-of-doors. During his wanderings on the American continent he has made an acquaintance with practically all of the flora and the fauna from Atlantic to Pacific, from Canada to Southern Mexico. His essays are those of a naturalist and trained observer presenting to the reader an intimate and comprehensive study, dealing with the habits of birds, insects and the friendly animals of the forest, and conveying the spirit of the mountains, the forest, the sea and the seasons, with literary charm and rare understanding. "In the Open" breathes the spirit of the out-of-doors. It carries you into the cool and shadowy heart of the forest, up snow-clad mountain slopes and out upon the wind-swept plain. Bird song, the hum of insect life, the wild fragrance of woodland flowers, and many of the elusive mysteries and beauties of meadow and mountain are so sympathetically interpreted as to make the reader wish with all his heart that he, too, were out "in the open."

Progressive Poultry Culture, by A. A. Brigham. 12mo, cloth. The Torch Press, Cedar Rapids, Iowa, $1.50 postpaid.

A good book on the many-sided topic of poultry culture is always welcome, and the Torch Press of Cedar Rapids, Iowa, is to be congratulated on being the publishers of Dr. A. A. Brigham's volume, "Progressive Poultry Culture."

The work is carefully and ably done by one of the oldest and best known specialists in the field to-day. Dr. Brigham is an acknowledged authority on the subject, not only in this country but in both Europe and Asia. Anything written by this skilled poultryman and lover of pure bred fowls is of the highest value as well as interest. He writes from large experience gained while resident at different times in six states of the Union and after having been Professor of Agriculture in Japan; hence it is easy to realize that a book of this character from him, must be of unusual excellence.

Gleanings from Nature. By W. S. Blatchley, Indianapolis, Indiana: The Nature Publishing Company.

In time of publication, this book is not new; but in the spirit of its contents, it is ever new and refreshing. The author says truly that he knows by experience, both on the farm and in the school room, that the possession of a better knowledge of nature by country youths is one of the crying needs of the hour. With such a knowledge generally diffused there would be less dissatisfaction with country life and fewer farmers' sons and daughters would flock to the cities, because, as a recent writer expresses it, "they wish to get rid of the prosy, stunting, isolated life on the farm." With a knowledge of some of nature's objects and a desire to ferret out for themselves some of her secrets, they would have something of which to talk and think beside crops, stock, work, neighborhood gossip and local politics, and the attractions of the city would seldom excel those to be found on the old homestead.

Gray's New Manual of Botany (Seventh Edition—Illustrated). A Handbook of the Flowering Plants and Ferns of the Central and Northeastern United States and Adjacent Canada. Rearranged and extensively revised by Benjamin Lincoln Robinson, Asa Gray Professor of Systematic Botany in Harvard University, and Merritt Lyndon Fernald, Assistant Professor of Botany in Harvard University. New York: Cincinnati: Chicago: American Book Company.

"In bringing Dr. Asa Gray's well-known Manual to date and into accord with modern views of classification and nomenclature, the present editors have found it necessary to rearrange it throughout, rewrite considerable portions, modify at least slightly, nearly all the descriptions, and adopt certain principles of nomenclature (notably the one relating to the first specific name) somewhat at variance with Dr. Gray's practice. Although these changes have been numerous and in some respects fundamental, it is believed that they are all in thorough accord with the liberal spirit of progress which characterized his own successive publications.

"Many of the older figures, formerly grouped in plates, have been redrawn and for greater convenience placed in the text, and to these have been added a much larger number of new ones."

American National Red Cross Text-Book on First Aid and Relief Columns. By Major Charles Lynch, of the Medical Corps, U. S. A. A Manual of Instruction for the Prevention of Accidents and What to Do for Injuries and Emergencies. Prepared for and Indorsed by the American National Red Cross. With a Preface by R. M. O'Reilly, Brigadier General, Surgeon-General, U. S. A. P. Blakiston's Son & Co., Publishers, Philadelphia. 74 Illustrations. Pocket-size; 244 pages. Limp Cloth, $1.00 net.

The Red Cross is in each country an organization recognized by the respective Governments for the purpose of rendering aid to the medical services of armies in time of war, and, furthermore, to mitigate the suffering caused by great calamities, and to devise and carry on means for preventing the same. It has, therefore, an important educational duty to perform.

For the purpose of further fulfilling this duty the American National Red Cross has issued the First Aid and Relief Column textbook for use in schools, colleges, Y. M. C. A's., in the family, and for service in the training of Nurses and Red Cross Relief Columns. Major Charles Lynch, of the Medical Corps of the United States Army, was especially requested by the Red Cross to prepare this text-book.

The author is a surgeon in the Army Medical Service, and has been especially detailed by the War Department to act as the medium between that department and the National Red Cross. His duties are to study and suggest in what way the services of the Society can be made the most available. Major Lynch was the U. S. Medical Attache to the Japanese Army during the Russian-Japanese War and while there had special opportunities for observing the improvised materials used by them in case of need, and their manner of rendering first-aid which proved of such value in the preserving of life during that war. He has been engaged in organizing First Aid and Relief Columns, lecturing before various branches of the Y. M. C. A., and otherwise devoting much time to this special subject. He has, therefore, a large experience of the necessities and practical value of such work and of the wants of those seeking instruction.

THE GUIDE to NATURE

STAMFORD, CONN.

EDWARD F. BIGELOW, Editor

Vol. 1 JANUARY, 1909 No. 10

Important Announcement

GOOD NEWS

TO

All Students and Lovers of Nature

AND TO

All Interested in Education

THE ESTABLISHMENT

OF

"ARCADIA" ON UNIQUE LINES

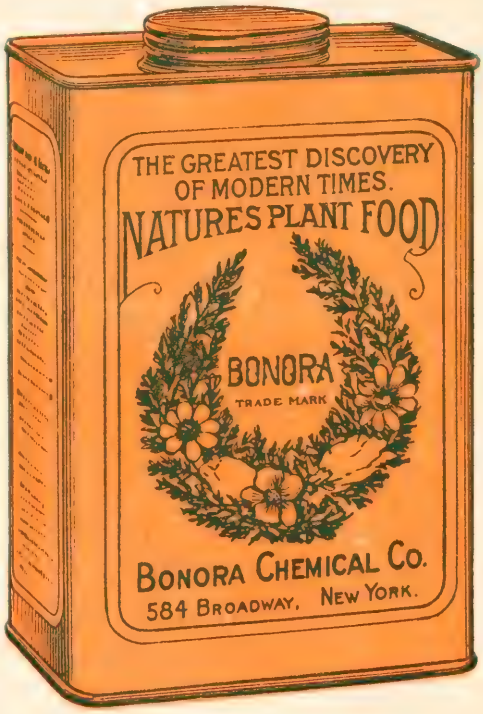
See page 381 and following.

NATURE'S PLANT FOOD

"BONORA"

THE GREATEST DISCOVERY OF MODERN TIMES

NOT a stimulant but an added quality to Nature, which becomes the life of the plant, making it to plant life what blood is to human life. Discovered by an English chemist, and now creating great sensation throughout the land. It is now being shipped to the remotest corners of the world. Used and endorsed by the greatest authorities in America, among them Luther Burbank, Eben Rexford, H. B. Fullerton (called the Luther Burbank of Long Island) and many others. Used by the gardeners of the following prominent people: Hon. Cornelius N. Bliss, Jacob Schiff, M. C. D. Borden, Geo. W. Vanderbilt, John D. Rockefeller, Hon. Joseph H. Choat, and a great many others.



"BONORA" is made of absolutely pure chemicals, immediately dissolves in water, and when sprinkled around the roots of the plant becomes available at once. "BONORA" will make your winter plants, hothouse plants, etc., bloom in profusion, giving them healthy color and wonderful growth. By its use plants are made to grow as if in the Tropics.

If your florist does not handle it, order direct. Put up in handsomely decorated cans, all sizes, as follows:

1 lb.	- - -	28 gallons, post paid	$.65
5 lbs.	- - -	140 " - -	2.50
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PUBLISHER'S NOTICES

The Guide to Nature.

EDUCATION AND RECREATION

AN ILLUSTRATED MONTHLY MAGAZINE FOR ADULTS. DEVOTED TO COMMON-PLACE NATURE WITH UNCOMMON INTEREST.

PUBLISHED BY THE AGASSIZ ASSOCIATION. OFFICE: 113 GROVE ST., STAMFORD. CONNECTICUT

Subscription, $1.50 Per Year. Single Copy, 15 Cents.

Entered as second-class matter, April 6, 1908, at the Post Office at Stamford, Conn., under the act of March 3, 1879

Vol. I JANUARY, 1909 No. 10

THE CHRISTMAS BIRD-LORE.

Bird-Lore for Christmas (The Macmillan Company, New York), covering the months of November and December, completes the tenth year of this fascinating and unique periodical. With a modesty remarkable as it is rare, the editor makes no claim for the great amount of good the magazine has done in its chosen field, preferring "to look ahead rather than behind." In addition to two splendid four-color plates made from Bruce Horsfall's drawings, there is an intensely interesting article on the sea birds which do their housekeeping and raise their families on Bird Rock, "way off in the middle of the stormy, fog-bound Gulf of St. Lawrence." Mr. E. J. Sawyer, tells an interesting story of "The Drumming of the Ruffed Grouse," and illustrates it with some remarkable photographs of the bird going through its peculiar performance. There is an interesting sketch of a "blind" used in the study of bird life, by the editor, a comprehensive report of the 1908 meeting of the National Association of Audubon Societies including reports by field agents and State Audubon Reports, and a list of the members of the National Association. Altogether, Christmas Bird-Lore is one of the best numbers ever issued.

A REMARKABLE LENS.

Two circulars of especial interest come to my desk. One contains a prism section of an 8 x 10 photograph of a crowd of people; the other a series of attitudes of an athlete turning somersault in mid-air from a springboard.

The photographs were the work of the Ic Tessar lens made by The Bausch & Lomb Optical Company, Rochester, N. Y.

I have never used a Tessar because I have preferred the Protar on account of its wider range of usefulness; but for specific speed and sharpness (with a peculiarly pleasing crispness of image) it does seem that this new Tessar is worth careful consideration by naturalists. The manufacturers claim that it is especially adapted to telephoto work. If any of our readers have used it in nature photography, will they please report results?

An Unparalleled Price for an Unparalleled Work.

See if you can buy an original copy of W. H. Edward's magnificent volume set of "The Butterflies of North America" for a cent less than the publishers' price, $135.00 net. If you would like a copy at $75, write and ask the editor of THE GUIDE TO NATURE about it. Hand drawn and hand colored plates.

WITH WHAT MADE?

No phase of THE GUIDE TO NATURE has brought more commendatory words than have our photo-macrographs; that is small objects like a fly's wing, the stamens of plants, etc., photographed under moderate magnification. It is but justice to the C. P. Goerz American Optical Company to state that all of these have been made with their exquisite gems—a three-inch and a five inch Celor. Several scientific friends and even a member of the Goerz office staff have expressed surprise that we use the Celor and not the Dagor for this scientific work. The Celor has been preferred because it better lights the ground glass and, of course, has the same depths when stopped down to same apertures as the Dagor. These little lenses are used in a 6½ by 8½ premo of forty-eight inches in length, front and back focus, with about a foot more of cone extension in front of the bellows. The apparatus was pictured on page 21 of our first number (April, 1908). Nothing short of an absolutely perfect lens will produce good lighting, flat field and sharp definition in such use. The Celors have been a delight. Nothing has come into my laboratory that does the work so well.

JUST THE THING TO SAVE THE PLANTS.

Any one desiring to procure an excellent hand plant sprayer to spray the leaves upon indoor plants, to keep the insects off and otherwise keep them



healthful, should send $1.00 to The G. N. Lenox Sprayer Company, 165 West Twenty-third Street, New York City, and receive one by return mail. This sprayer will spray under and over the leaves. Three cakes of tobacco soap to make a spray solution will be included.

REMARKABLE BONORA.

Our readers know from former extensive advertising in THE GUIDE TO NATURE of the extended experience with nutritive plant tablets. Those are good for scientific experiment, but for plants in pots and general use with plants in the "window garden" or in the greenhouse Bonora is far better. If we were to write pages regarding this wonderful plant invigorator we could not say more.

There was a full account of this plant food in the November number of THE GUIDE TO NATURE. Bonora is universally praised by those who have used it. These users include leading growers of plants such as The Conard & Jones Company, John Lewis Childs, Luther Burbank, Eben Rexford and others. See the advertisement on the second cover page of this issue. Send for Bonora, make your plants thrive and be happy.

Nature and Science FOR YOUNG FOLKS

(A Department of
The St. Nicholas Magazine
PUBLISHED BY
THE CENTURY COMPANY
New York City)
Edited by
EDWARD F. BIGELOW

The publishers in their announcements for 1909 refer to Nature and Science as "that delightful and helpful department" and state that it "promises more interest and profit than ever."

"Nature and Science has won its present high standing by accuracy in portraying nature from the standpoint of the child. The editor has secured the co-operation of nearly all the best naturalists, scientists and nature artists in the country. The text and illustrations are directly from nature—not from books—and are absolutely true. So carefully is every statement weighed, questioned, and criticized, that every parent, every teacher, every child has implicit confidence that a statement in Nature and Science can be absolutely relied on. And it's interesting."

There is an estate on which we pay no tax and which is not susceptible of improvement. It is of indefinite extent and is to be reached by taking the road to the nearest woods and fields. While this is quite as valuable as any property we may possess, as a matter of fact few assert their title to it.

Nature is in herself a perpetual invitation to come into the open. The woods are an unfailing resource; the mountains and the sea, companionable. To count among one's friends, the birds and flowers and trees is surely worth while; for to come upon a new flower is then in the nature of an agreeable event, and a chance meeting with a bird may lend a pleasant flavor to the day.—"*In the Open*," *by Stanton Davis Kirkham.*

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I JANUARY, 1909 No. 10

THE OUTDOOR WORLD

The "Chestnut-Worm" and Its Enemies.

BY FRED. E. BROOKS, MORGANTOWN, W. VA.

PHOTOGRAPHS BY THE AUTHOR

MANY persons are intimately acquainted with the plump, white worm that inhabits the meat of the chestnut and yet have never met the very stately and dignified beetle that is the parent of the worm. Since the coy ways of the young creatures often beguile the lover of good nuts into the closest contact with them it is but seemly and proper that he should know the head of the family and his somewhat timid wife. He ought to have a look at the old lady's methods of housekeeping and learn something of the family associates. Let me warn him, however, that in seeking an introduction he should not thrust his presence upon the old folks too suddenly for they dislike meeting strangers and will tumble over in a dead faint if his call is not orderly and well conducted. If such a mishap should occur the entertainment which they give only to privileged callers will be withheld.

There are two species of the worms that are commonly found in chestnuts. One has been called the "greater chestnut-weevil," and the other the "lesser chestnut-weevil." The habits of the two species are very similar and there is scarcely any difference in the appearance of the worms except that, when full grown, one is nearly twice the size of the other. It is of the larger weevil, the one known technically as *Balaninus proboscideus,* that I write.

My acquaintance with this insect was acquired in the hilly region of central West Virginia, where the American sweet chestnut grows in luxuriance, and the notes given may

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apply more particularly to the species as it occurs in that locality than in places farther to the north or to the south.

During the first two weeks of August, when chestnut-burrs are about half-grown, there will suddenly ap-



"NICE, FRESH CHES-EE-NUTS, ONLY TEN-AH CENTS AH GLASS."

pear upon chestnut-trees large numbers of long-snouted, grotesque-looking beetles. The beetles are beautifully mottled with two shades of brown and are, exclusive of the snout, about half an inch in length. The snout of the female is longer than the rest of the body and that of the male considerably shorter. A few bright warm days following a shower or rainy period, at the season of the year mentioned, is sure to bring the beetles out. After August 15th, an examination of bearing trees, in localities where the chestnut abounds, is almost sure to reveal a good number of the beetles. They continue on the trees until late in October but gradually decrease in numbers after the last of August. The beetles are so curious in appearance and so interesting in their actions that anyone who spends a little time in watching them will feel well repaid for his trouble.

In ten days or two weeks after their first appearance on the trees the females begin to lay their eggs. When an egg is to be laid she selects a place on the side or end of the burr—she is not particular as to the exact location—and after many high steps and much shifting of her long legs, she gets a foothold among the spines. She then raises her body to the full length of her legs, draws her snout downward and backward until it extends in a rigid line from the front end of her body to the husk of the burr beneath. The only mouth which the insect has is located out on the end of this snout. The other end of the snout is attached to the front part of the head and the head, which is round like a ball, fits into a concavity in the front end of the thorax, the two forming a sort of ball-and-socket joint. The mouth is made up in part of a strong, sharp set of jaws and when the beetle has taken the position described she begins to rotate the snout by turning the head in the joint at the thorax. At each turn the snout and head revolve about half way around. The steady, rotary motion is kept up with very little rest and meanwhile all the pressure possible is brought to bear on the snout. This forces it gradually into the husk until a puncture is made which extends through the husk, the silken lining of its inner surface, the shell of the nut and its lining to the kernel of the nut which, at this time, is just beginning to form. When the kernel is reached the beetle deliberately withdraws her snout from the puncture, reverses ends as though she were hung on a pivot, and projects a long, tube-like ovipositor from her anal extremity. This ovipositor is a flexible, two-jointed arrangement which telescopes together and is withdrawn into the body when not in use. It is about as long as the snout but the observer does not get to see its full length for when only a fourth of

it is in sight the beetle begins to move it about over the surface of the husk in search of the hole which she has made. When the opening is found the point of the abdomen is quickly pressed to the entrance and then the ovipositor is extended to its full length and an egg passed down and deposited just at the inner lining of the shell of the nut. When the egg is laid the beetle withdraws her ovipositor into her body and crawls away.

From the small, white egg, there hatches in about ten days the familiar chestnut-worm. The worm at first is very small but it grows rapidly, for all about it is an abundance of rich food. When full-grown it escapes from the nut through a large, round hole which it eats in the shell. When it has left the nut it never enters another, but works its way into the ground. There, a few inches below the surface, it hollows out a cell in the earth in which it passes the winter and the spring following. It remains a worm, of the same size and appearance as when it left the nut, until July of the following summer. At that time it changes within its cell to a curious-looking pupa. In the pupa stage it remains for two or three weeks and then within the space of a day transforms to a beetle. Soon after this last change it crawls forth from the ground and flies to the branches of a chestnut-tree and the life-cycle is complete.



THREE FEMALE WEEVILS ON YOUNG CHESTNUT-BURRS DURING THE EGG-LAYING SEASON.



THE MALE WEEVIL. THE SNOUT IS ONLY HALF AS LONG AS THAT OF THE FEMALE.



A FEMALE WEEVIL MAKING HER EGG PUNCTURE IN A YOUNG BURR.



"CHESTNUT-WORMS."

PUPÆ OF "CHESTNUT-WORMS."
The worms pass through this stage in changing to beetles.

It is an interesting fact that about one worm in every ten that live to become beetles remains unchanged throughout the following summer and does not develop into an adult until the second year after it leaves the nut. When July of the second year comes these hold-over worms change to pupæ and in due time issue from the ground along with the other beetles which have developed from the worms of the previous season's brood. This curious phenomenon is evidently a provision of nature to prevent the species from dying out if for a single year there should happen to be an entire failure of the chestnut crop.

The career of the chestnut weevil is not one of undisturbed tranquility for the different stages of its life are beset with dangers. Among its enemies there are three belonging to the animal kingdom which I wish to mention: a two-legged enemy which is jealous of the food it eats, a four-legged enemy which eats it, and a six-legged enemy which uses it as food for its young.

The biped is man himself, and as he, from the weevil's standpoint, is the least of the three, I will dismiss him with the statement that with all his improved methods of combating insect pests he



CELLS IN THE EARTH IN WHICH THE WORMS SPEND ABOUT NINE MONTHS OF THE YEAR.
The figure on the left shows a cell occupied by the cocoon of a parasite that has killed the worm.

has so far discovered nothing that will prevent nuts from becoming wormy. The quadruped is a small mammal known as the short-tailed shrew. This little mammal is not very well known to people in general, not nearly so well known as it should be; for it is very abundant in the country and is of much economic importance. The hexapod is a little, wasp-like insect that does not yet have an English name but which is dignified with the scientific name *Uroseigalphus armatus*.

The short-tailed shrew is about the size of the common house mouse. It has a pointed nose, short tail, and is pig-like in build. The eyes are very small and the ears short. The body is covered with a thick coat of velvety fur of a glossy slate-color. It lives for the greater part of its life under-ground and feeds on grubs, beetles, snails or flesh of almost any kind that may come in its way. It has a ravenous appetite and day and night, winter and summer, it is busy searching for food. The tender, juicy chestnut-worms are exactly to its liking. I have frequently fed shrews in captivity on these worms and have been surprised at the number they would eat.

It happens that the hibernating quarters of the chestnut-worms are directly in the hunting-grounds of the shrew and during the fall, winter and spring months the shrews feast upon the worms. If in the fall or winter any one will take the trouble to dig into the surface of the ground beneath the branches of bearing chestnut-trees, especially if the trees are in the woods, he will find, just beneath the leaf-mold, a net-work of burrows and run-ways that are used by the shrews. If he is in doubt as to what animals are keeping these burrows worn smooth by constant use let him set some mouse-traps, baited with meat, in a few of them. His catch will probably consist of a few white-footed mice, an occasional pine mouse and possibly a long-tailed shrew or two but the short-tailed shrews which he takes will most likely greatly out-number all the others combined. A look at the burrows will convince anyone that the worm that would seek hibernating quarters in such a place must take its life in its hands. About the only worms that escape are those that make their cells in gravelly soil where the shrew finds it hard digging or in crevices between stones and roots. There is perhaps no other agency that does so much to reduce the numbers of weevils, and thus prevent all the chestnuts from becoming wormy, as this little friend of the nut-grower, the short-tailed shrew.

At about the time the adult weevils



ADULT PARASITE OF THE "CHESTNUT-WORM."

The larva of this little wasp kills the worm after it enters the ground.

COCOON OF THE PARASITE.

Three of these cocoons have the heads of "chestnut-worms" adhering to them. The head is all that is left of the worm after the parasite is through with it.

appear on the chestnut-trees and begin to lay their eggs, there also appears the little, wasp-like parasite which has been mentioned. It is an active creature, having four wings and a long hair-like stinger, or ovipositor, which it carries projecting straight behind. If caught, it will emit a strong, disagreeable odor that will cling to the hand after repeated washings.



THE SHORT-TAILED SHREW.
An enemy of the chestnut weevil.



SNAP-SHOT OF SHREW IN CAPTIVITY.
Feeding on "chestnut-worms."

This little wasp searches about over the burrs until it finds a puncture in which one of the beetles has deposited its egg. Into this puncture it inserts its ovipositor which is just long enough to reach the egg of the weevil. Here, near the weevil's egg it lays its own egg and then flies away. I have frequently seen these wasps laying their eggs in the weevil punctures but, in spite of careful search, I have never been able to find a single egg. The egg must be very small and no one knows exactly where it is deposited or how it looks. It is known, however, that when the little grub hatches from the egg it lives internally on the chestnut-worm. No apparent injury is done to the worm until the next summer at just about the time it would change to a pupa. Then the parasitic grub kills its host, emerges from its body and constructs a gauze-like cocoon in the cell prepared by the chestnut-worm for its own puparium. From this cocoon there emerges in a short time the adult wasp which works its way up to the surface of the ground and is soon on the chestnut-trees busily engaged in looking for weevil punctures in which to lay its eggs.

BIRD NESTS IN MAIL BOX.

A remarkable story of bird intelligence is told by Henry Babb of Bowdoinham, whose mail box is on the R. F. D. route. One side of this box is broken, and some time ago, Mr. Babb found a bird had built her nest in the box, going in through the hole made by the broken place. The bird set up housekeeping in this novel home, and now there are five young birds and the mother. Several times the mail carriers have tried to drive the bird away, and at first they took out the nest and threw it away, but every time the bird returned, and, after the young ones came, they gave up trying to dislodge them. Last week Mr. Babb found the signal set on the box and looked for mail, but found none in the box. This happened a number of times, so often that he decided that someone had tampered with the box. So he asked the neighbors to watch out. One day, when a neighbor, George Hackett, drove by, he saw a bird flying from the box with something in its mouth. He followed the bird to a tree some distance away, and there the bird stopped, and, after dropping the article she carried, flew away. Mr. Hackett went under the tree and found four letters addressed to Mr. Babb. Each one had been brought apparently by this unusual messenger. Just why the same tree was selected every time seems strange. One theory advanced to account for the removal of the letters is that their presence in the box interfered with the domestic arrangements of the feathered lodger, who took this way to get rid of them.—From newspaper.



The garden, floriculture, domestic plants, suggestions for "the grounds beautiful," inexpensive greenhouses, gardens for young folks, hobby houses in the back yard, etc.

MAMMOTH CALADIUMS.

BY DR. G. A. HINNEN, CINCINNATI, OHIO.

Our common Caladium, so-called by nearly everybody, and mentioned as such in the various floral catalogs, is not a caladium, but a Colocasia, according to Gray. Furthermore, the variety *esculenta* being subordinate to the species *antiquorum*.

It is a native of tropical America where it grows along ditches and marshes, attaining a height of two to three feet; the latter figure seeming to be the maximum, for the various authorities are agreed upon this point. Gray speaks of the leaves being "two to three feet long when full grown." And our own local botanist, C. G. Lloyd, who has seen the plant in its native home, assures me that it approximates a height of two or three feet.

I know of no example illustrating adaptation to a changed environment, and a response to cultivation so well as the caladium. My caladiums are larger than any I have ever seen, and larger than any I have been able to find records of. It is needless to say that I have been exceedingly proud of them, and as I have



THE MAMMOTH CALADIUMS.

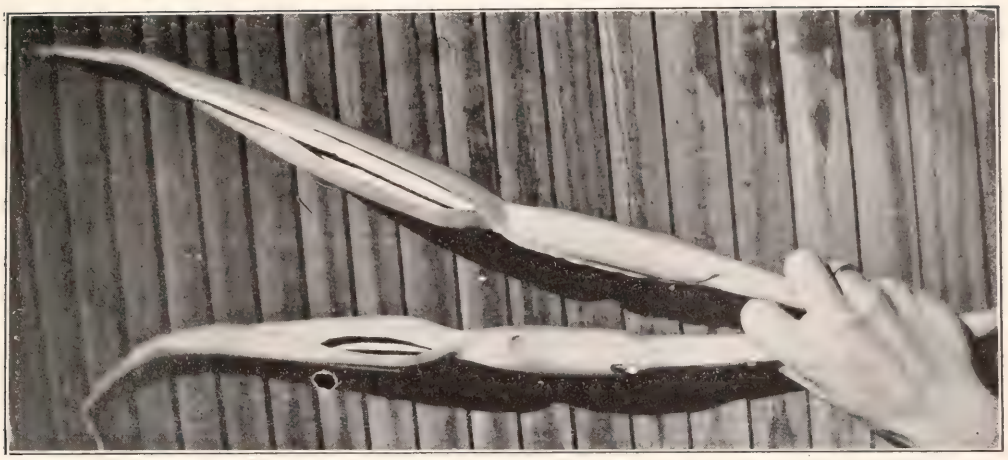
frequently been importuned to tell the secret of their prodigious growth, will here enumerate the facts. I always assure my visitors that there is no trick, but it is simply a question of water. For years I have studied this plant from every aspect, until its life history and its wants have become absolutely familiar to me. In fact, at one time I had even commenced an elaborate chemical analysis of the alkaloids contained in the sap.

To begin with, my bulbs or tubers, as they are commonly called in the dried state, such as you buy in the shops, are exceptionally large, frequently measuring twenty-two inches in circumference, and they may be from twelve to fourteen inches high. These dry or dormant bulbs are planted in cold frames during the latter part of March or the early part of April, this being regulated entirely by climatic conditions. Here they are allowed to become infused with new life, which they do very promptly, the delicate pink stalks shortly pushing their way through the soil into the sunshine, and the fine rootlets going downward and laterally, radiating in all directions. After remaining here for possibly four or five weeks, or until practically all danger from frost is over, the sprouting bulbs are transplanted to their beds in the open air, the greatest care being exercised to avoid as much injury as possible to the delicate rootlets. The whole bulb and about an inch of the green stalk is sunk into the ground, for by this time the leaves are twelve to fifteen inches high.

Now for the secret, if such it may be called. The whole question is one of water. Caladiums revel in an abundance of water; at the same time they do not relish a superabundance, for they are not true aquatics. If the weather is extremely hot, they are watered four or possibly five times in the course of the day; if but moderately hot, twice may suffice. The beds in which they are planted are edged with a row of brick, in such fashion that the bricks extend above the ground about an inch and a half; in this way the water as it runs from the hose, can not run right off the



A CALADIUM LEAF.
Compared in size with a man's hat.



"THE FLOWERS ARE SHAPED LIKE ENORMOUS JACK-IN-THE PULPITS."

top soil, but is retained and checked, and can only disappear by gradually soaking into the soil.

With their enormous surface exposed to the sun, the transpiration is exceedingly great and unless watched carefully the leaves soon show evidence of excessive heat by beginning to droop. This should be avoided, for a large and heavy leaf seldom if ever regains its normal position and erect attitude after it has once drooped. A windy day also causes rapid and excessive transpiration with the same tendency to droop, and water must be supplied liberally. Another characteristic is their tendency to break during a wind storm, the enormous leaves being torn into strips, and the ponderous stalks snapping like glass.

A friend who had watched my plants with interest for some years, thought he could improve on my methods. Accordingly he had an enormous hemispherical pond excavated, which was lined or faced with concrete, making a magnificent artificial pool. Water was conducted into this pool through four drains, which were embedded in the concrete. The bottom was filled with broken pot sherds, rocks, etc., and a goodly layer of soil over all. While the prospect seemed good, the caladiums did not seem to appreciate this arrangement, evidently getting entirely too much water, and they did not attain to his expectations. The roots want an abundance of water, but they will not tolerate being bathed in it constantly.

As one hot day succeeds another, the interest in the development of the caladiums increases proportionately, for each new leaf vies with its fellows and is not satisfied until it has out-stript them in the race, and towers above them in all its proud and stately glory. From a number of observations taken at different intervals I should say the plants average about five inches of growth per week; this figure, of course, being a mere approximation, for so many factors enter in such a study that an exact figure can not be given. It may be interesting at this point to give a short table showing the height as well as the size of some of the leaves.

No.	Height of leaf. ft.	ins.	Length of leaf. ft.	ins.	Width of leaf. ft.	ins.	Date
1	7	2	3	7	2	8	Aug. 17, '98
2	7	11	4	1	2	11	" " "
3	7	1	3	6.5	2	5	" " "
4	7	8	4	0	2	11	" " "
5	8	11.5	4	0	2	11	Oct. 1, "
6	9	1	.	..	.	..	" " "
7	7	10	4	2	2	9	Sep. 23, 08
8	8	0	4	4	2	11	" " "
9	8	8	4	0.5	2	8.5	" " "
10	8	10	4	1.5	2	9	" " "
11	8	10.5	4	1.5	2	9	" " "
12	9	1	3	10	2	9	" " "
13	9	1	3	10.5	2	7	" " "
14	9	1	4	2	3	0	" " "
15	9	2	3	10	2	10	" " "
16	9	3.5	4	0.5	2	9.5	" " "
17	9	5	4	4.5	2	9.5	" " "
18	9	5.5	4	1	2	8	" " "
19	9	7	4	2	2	11	" " "
20	9	9	4	3.5	2	7.5	" " "

Can you imagine the glory of such growth, from a dried-up bulb in spring to an enormous height of nine feet or more, with leaves ranging in length from three to four feet? But alas, their glory is but ephemeral; it is to be short-lived, for some night not so far off, Jack Frost will make his rounds and get in his horrid work, and on the following morning we will be met by a sickening sight. Where once our stately giants had towered high in the air, nodding a happy welcome each day, there will be nothing but a blackened wilted mass on the ground—to me the saddest spectacle of the entire year.

Tenderly the blackened remains are exhumed, for to expose them to another frosty night would mean death to the bulbs. The leaves are cut off, and the bulbs piled up in a heap, under shelter. It is at this particular time that the greatest care must be exercised in handling the plants, for where a delicate rootlet has been torn from the bulb, an avenue has been opened for dry rot. After being exposed to the air for about two weeks, as much soil is *shaken* from the bulbs as will come away; at no time are the bulbs to be thumped to accomplish this, for every bruise means the life of the bulb later on. The stalks, which had been cut back to about four feet at the time the plants were taken from the ground, are now reduced to about three feet; in other words, they are cut back another foot. To cut them back too deeply at first means too great a loss of sap.

The question of storing the bulbs in winter seems to be the most difficult problem of all. Many are the methods I have used, and many are the bulbs that have been sacrificed, until the present method of caring for them was devised. Each bulb, which still has a goodly portion of soil clinging to, and interwoven with the rootlets, is inverted, and suspended in this fashion from the ceiling in the cellar. It must be remembered at this point that the stalks still measure about three feet. The suspension of the bulbs is accomplished by using wide bands of a heavy duck, and forming this into a noose; it must be wide or the bulbs will be cut and bruised by their long continued dormancy.

About January first, or during the holidays, the bulbs must be inspected. A large portion of the stalks which had been allowed to remain, will be found to have undergone decomposition, and this must all be removed; in other words the cleaning process must extend down to the smaller inner healthy stalks, the latter being arranged in a sheath-like fashion, one closely surrounding the other. The healthy stalks will be recognized very readily by their clean pink color. The danger from loss of sap at this time is practically nil. The bulb proper is also included in the inspection, and the soil remaining about the rootlets has now become very dry; the bulbs are again shaken vigorously. The temptation to get rid of all of it at this time is great, but under no pretext must this be done, for as I have mentioned before, each injury of this kind invites an attack of germs and by spring the dry rot will have eaten its way far into the very center of the bulbs.

Generally it is not necessary to repeat this inspection, but one must be ever on the alert, for no plant is so liable to be attacked by fungus growth and decomposition as the caladium. It may be wiser to give them another thorough overhauling during the latter part of February. By the middle of March or the beginning of April, the bulbs are in readiness to begin another cycle of growth. Now all the rootlets are thoroughly removed, and the stalks are cleansed again of any decomposition; where this has extended very far, there may be no pink stalks left, and the top of the bulb may be devoid of any evidence of stalks, but every bit of diseased tissue must be thoroughly removed with a sharp knife. All evidence also of lateral sprouts or small bulbs at the side of the large ones must be thoroughly removed, and now they are ready for the cold frame.

During the summer months an effort is made to prevent all lateral sprouts or the formation of small bulbs; this is not always attended by success for the small plants appear almost as if by magic. The height of the plants and the size of the leaves has been mentioned, but no reference has been made to the circumference of an individual plant when at its

greatest development; this averages about twenty-three inches.

Another feature, usually overlooked in this plant, is the strange and magnificent flowering. The flowers are shaped like enormous Jack-in-the-pulpits. The color of the sheath as well as that of the spathe is a most peculiar shade of yellow; a soft shade of yellow midway between that of canary and lemon. The odor is most peculiar and characteristic, and can be detected several hundred feet away. The flowers are borne on stalks from two to three feet high. Some of those I have preserved in formaldehyde measure twenty inches in length.

It has been a great surprise to me again and again, to see how very few people are aware of the fact that this plant blooms; in fact I have had my statements to this effect questioned frequently. The two flowers shown herewith are the first ones of this season; they measure eighteen inches from the calyx to the tips of the spathes. The color is a peculiar shade of yellow, midway between lemon and canary. The odor is very pronounced and powerful, and somewhat resembles ripe bananas.

RAISING NEW PLANTS.

BY ERNEST HEMING.

However superficially we study nature, we cannot help but see the struggle for existence that is constantly going on with all life and yet at times we are apt to cry "back to nature" thoughtlessly without realizing what a poor existence it would be if we depended upon the uncultivated prairie or virgin forest for our existence.

When the Creator endowed man with brains he truly gave him power over the birds of the air and beasts of the field.

When we look at a field of corn with the ripening ears reaching out across the rows or a field of cabbage with their solid heads, we are apt to pass it by with the thought that it is the result of good cultivation and a generous, rich land. But it is more than that. It is the result of generations of thought and study. Few would recognize the ancestor of the cabbage, *Brassica oleracea,* an insignificant weed, which by hybridization and selection through the centuries has been brought to the present state of usefulness to man.

The *Zea Mays* or Indian Corn has been cultivated so long that its origin is lost in antiquity, and so it is with all our flowers, fruits and vegetables. The possibility of food supply, our very existence is owing to the tireless brains and hands of former ages.

There is nothing more fascinating than a knowledge of the power making it possible to produce new forms, new types in nature. That man can to a certain extent guide the divine law of evolution and divert it to the attainment of his own comfort and pleasure.

All horticulturists with ambition feel the desire to produce something that excels, something larger and better than has been produced before or to get something new, but few have the patience to accomplish. The process is slow. It took, we might say, centuries to produce the York Imperial Apple from the wild crab, or the Jack Rose from the wild briar, or the Early Rose potato from the wild type of *Solanum tuberosum.*

It was this ambition or desire that influenced the writer to make many experiments in hybridizing, the failures do not make interesting reading so need not be mentioned. Success came with experiments on the mallow family.

The swamp mallow with its large white flowers and crimson centres are so common in the low, wet ground in New Jersey and other eastern states that few could travel by train during August without noticing them from the car windows.

Some of them are a beautiful pink shade of color. It was this that led to an attempt to improve them by gathering seed from the best flowers and cultivating them with the hope of improving them. This led to failure. They seemed to lose the pink color and only became coarser with good treatment.

The late Thomas Meehan suggested hybridizing with the hollyhock which

is very closely related. This resulted in failure as likewise did attempts to cross with the rose of Sharon, *Hibiscus Syriacus*.

Among the extensive collection of plants on the nursery was a mallow of a very brilliant color, *Hibiscus coccineus*. This was not hardy so far north as Philadelphia and so of course had to be grown in the greenhouse. The color was so brilliant that it really suggested itself as a likely subject to hybridize with the common mallow, with a view to making it hardy enough to withstand the northern winters. Having failed with attempting too violent a cross, such as by use of the hollyhock and althaea, the pollen of a very hardy Hibiscus, (*Militarus,*) with a closer botanical relationship was used. The pollen of the latter was used to fertilize the brilliant-colored one with the hope that the progeny resulting from the cross would retain the color and be hardy in the northern states, or, in other words, combine the hardiness of the pollen parent with the brilliant color of the seed parent. This proved a success; the pod of seed ripened and was sown in the open ground. One of the seedlings had the dazzling, brilliant color and proved to be quite hardy, standing out unprotected. In fact, the original plant is still growing on the nursery.

With such a plant to work with it was possible to set to work in earnest to improve the swamp mallow.

In 1900 the flowers of the new hybrid were pollenized with *Hibiscus*



LUXURIANT GROWTH OF MALLOWS

moscheutos. When the seedlings came up it was noted that there was quite a diversity in form of foliage pointing to a successful cross, and the flowering of them was looked forward to with that interest that can only be aroused by promise of success after repeated failures.

The first flower to open was a glorious pink, a shade never before seen in the swamp mallow. This was followed by others of every shade of pink, white, red and scarlet, some of the last being much darker than the parent.

The gratification felt can readily be understood after so much patient work upon the birth of a new race of garden plants that bid fair to be among the most popular in the garden. From this period on every effort was used to improve and fix this new race. All poor forms are eliminated as soon as they flowered, the seed for future sowings being saved from only the best plants. Thousands of flowers were artificially pollenized each year, the pollen from the very best forms only being used, so that there has been a steady improvement each succeeding year.

Flowers are carefully watched to note any tendency toward a double flower or other desirable forms for the garden, and efforts are being made to fix those types that are especially worthy.

Nature, though a liberal pay mistress, is an exacting employer and only rewards intelligent and faithful service.

* * * * *

Meehans' Mallow Marvels, as this new race of plants has been appropriately named, have a very rugged constitution. All the parents grow naturally in rather swampy or moist ground. It is a curious fact, however, that when brought into cultivation they thrive better if planted where the ground is fairly well drained, yet where it is reasonably moist especially during the growing season. Ground that will grow good corn suits them to perfection. They should have a position that is open and sunny and where the ground is deep, rich and moist. In such a position one plant will form a bush 6 or 8 feet high and 5 or 6 feet through in about three years. They usually commence flowering about August 1 and while the individual flowers are not very lasting, being so large and produced in such profusion, they truly make a glorious sight for many weeks, as they continue in flower almost until frost.



A MALLOW FLOWER.

What makes them especially valuable for a garden plant is the fact that they flower at a season when there is a dearth of bloom among hardy perennials. When the frost strikes them, of course, the stems are completely killed. They may then be cut off within four or five inches of the ground, just sufficient left on to show where the plants are so as not to be overlooked when replanting the garden in early spring.

It is a curious fact that the mallow is one of the last of the hardy perennials to make its appearance above ground in spring. Very often they are considered to be dead because pæonies and other plants growing alongside of them will very likely have tops from 8 to 10 inches before the mallows have begun to show any signs of life. When they do commence to grow, however,

they make rapid headway and soon lead in height in the mixed border of hardy plants.

The mention of pæonies suggests these two plants as an excellent combination for planting in a bed. The pæonies blooming in May and June and the mallows in the fall, make a good combination. A round bed, for instance, with four or five mallows, set about two feet apart, with a border of pæonies, gives a very good effect both spring and fall, and makes a bold and striking clump for the lawn.

The mallows are also excellent for planting in the mixed border. Of course, owing to their height and size they have to be kept well to the back, or in the foreground of a shrubbery border where a bold, striking plant is wanted to relieve the monotony of the green during the fall months; but perhaps where they are most at home and more appropriate than anywhere else is in well selected positions along streams or in the proximity of water, where they look at home and fit in well with the surroundings.



THE BIOGRAPHY OF A CHIPMUNK.

BY T. J. HENRY, M. D., APOLLO, PA.

The chipmunk, hackey or ground-squirrel as it is variously known throughout the states may be so common that it is uninteresting. It was my good fortune to watch one from his birth to his independency. His slowness in maturing was surprising. Early in July, 1906, an old squirrel was caught and caged as a pet for the children. Shortly afterwards she was noticed making a nest with much more care than usually exhibited by them in captivity. The cage was simply a box with wire screen in front and no nesting box. The nest



CHIPMUNK TWENTY-SIX DAYS OLD. (Photograph from life.)

BOY AGED SIX WITH CHIPMUNK TEN DAYS OLD.

was made of dried grass and paper and the central portion was of very finely divided pieces. On July 17, a small squeaking sound announced the presence of a new life. On inspection, this tiny bit of pink squirrel life was found to be "the size of a peanut goody" as one of the children expressed it. In the skin could be seen the pigmented stripes indicating the position of the future black hairs. It is remarkable that though it squeaked when disturbed the first two days, thereafter it remained absolutely quiet when handled until over a month old. On July 28, eleven days old, it measured three inches from tip to tip, was ill shaped, hairless, blind. Its head was larger than its body. Very slight noticeable growth of hair started at this time. By August 6, the hair covered its head sufficiently to give it a velvety appearance. Two days later it extended over its body, giving natural color to the squirrel. Its tail, however, was ratlike. August 12, it measured four inches from tip to tip and the accompanying picture will give a good idea of a chipmunk twenty-six days old. August 19 it squeaked and struggled when taken from the nest. This was the first sound I had heard it emit since it was two days old. August 20, thirty-five days old, its eyes opened for the first, a much longer time than is required for kittens, rabbits, &c. After August 23, its tail became distinctly bushy. It was shy and avoided being handled, but made no attempt to bite. August 25 it was found running about in its cage and appeared almost half grown. Although it was handled every day it became cross during nut storing time and made attacks as if to bite but never bit through the skin, though no doubt it could have done so had it tried. A tight, warm box was fitted to the cage for winter and this the two made their nest and stored their food. Even during the coldest days of winter, if the cage was tapped upon, the young one would come out and take what food was offered although there was a plentiful supply in store. As the cage was not kept in the house it was several times below zero when he responded to my call. This indicates that they do not lie dormant as some suppose. I have frequently seen wild ground-squirrels out in mild days of winter. The cage door having been left open, the old one escaped and was not seen again. The young one knowing no other home permitted me to pick it up and put it back into its cage. Several times after this it escaped but played around the yard until replaced. This unfortunate squirrel fell a victim to an animal burglar. In the month of July when one year old a large rat attracted by the store of nuts and grain, gnawed into the cage and foully murdered the squirrel and having devoured his head, dragged him out and took possession of the nest. It may be well to state that there are generally several young ground-squirrels in a family. I have often seen five or six run into the same hole.

OWNEY, THE RAILWAY POSTAL CLERKS' MASCOT.

In the autumn of the year 1886, a miserable little cur, cold, wet, hungry, with his tail between his legs, slipped into the post office at Albany, New York. He was not observed until the time arrived for sending off the mail bags, when he was found curled up and asleep on the pile of leather pouches. As he so plainly was friendless and so plainly, too, was begging to be adopted by somebody, the clerk sympathised with him, fed him and gave him a little kind treatment. He asked for nothing more. He was satisfied and stayed in the office until he had recovered his wasted strength. Where he had come from was not known. Why he came into the post office rather than into any other warm and comfortable building was as great a mystery. He soon fell into the habit of following the pouches, for which he seemed to have a special affection, trotting behind the mail wagon to the railroad station. There he one day seemed to conceive a new notion. He decided to travel. Slipping into the mail car, unobserved as he had been at the post office, he went to sleep on the bags, until a clerk discovered him, when his appealing looks and movements again brought him sympathy and welcome. He was absent for a long time. Where

he extended his travels was not known, but one day he sedately walked into the office at Albany, rested for a few days, was fed on soup and beefsteak saved for him from the clerks' dinner, and then



FIG. 1. "OWNEY," WHO TRAVELLED WITH MAIL BAGS IN ALL PARTS OF THE WORLD.

vanished. As he pretty regularly repeated these movements, he soon became known as a traveller and the Albany clerks supplied him with a collar and a tag on which they asked that his travels be recorded. The name "Owney" was given him probably because he appeared to be his own owner, and independent too after he had once "found himself."

For several years he continued to travel from place to place, always using the mail cars and never on any account entering a passenger coach. For eleven years his life was thus passed and the records show that he saw nearly all parts of the United States, some of Mexico and of Canada. At one time he was detained in Montreal and the postmaster there refused to release him until a board bill of two dollars and fifty cents had been paid. This the clerks in the Albany office contributed and forwarded to Montreal, when Owney resumed his travels. He followed the mail pouches aboard ocean going steamers and visited various points in Europe and in Asia as well as other parts of the world. On one occasion, on his arrival at Washington, Postmaster General Wanamaker saw him and had made for him a harness to which he attached the tags and the various medals which Owney had received from admiring friends. Some one in Mexico had given him a silver dollar; the Mikado of Japan presented him with a silver medal bearing the Japanese national coat of arms. Finally the harness with its weight of medals and souvenirs became so much of a burden that it was removed and is now preserved in a case in the Washington post office.

In 1897 he visited Toledo, Ohio, and was confined in the cellar of the post office there until a photographer could find it convenient to call on him for his picture. The confinement and the delay were so irksome to Owney that he gave vent to the expression of his irritation and bit the hand of a clerk who attempted to soothe and caress him. The frightened man spread the report that Owney was mad. This frightened the post master, a policeman was called and Owney's career was ended by a bullet.

Fig. 1 shows a portrait of the remarkable animal; Fig. 2, his body, with its harness and medals, as preserved in the National Museum at Washington, D. C.

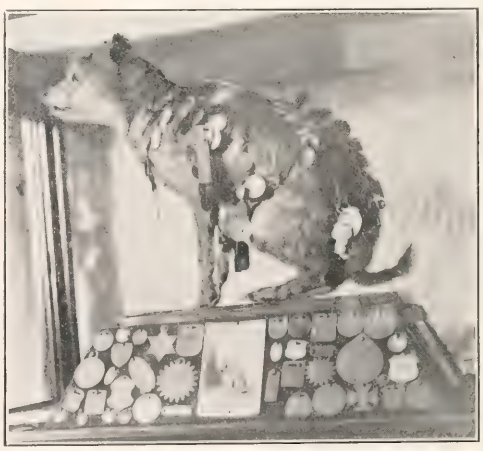


FIG. 2. OWNEY WITH HIS MEDALS IN THE POSTAL MUSEUM AT WASHINGTON.

ELK ON AN INDIANA FARM.

BY SILAS G. WRAY, PHOTOGRAPHER, GRAND JUNCTION, COLORADO.

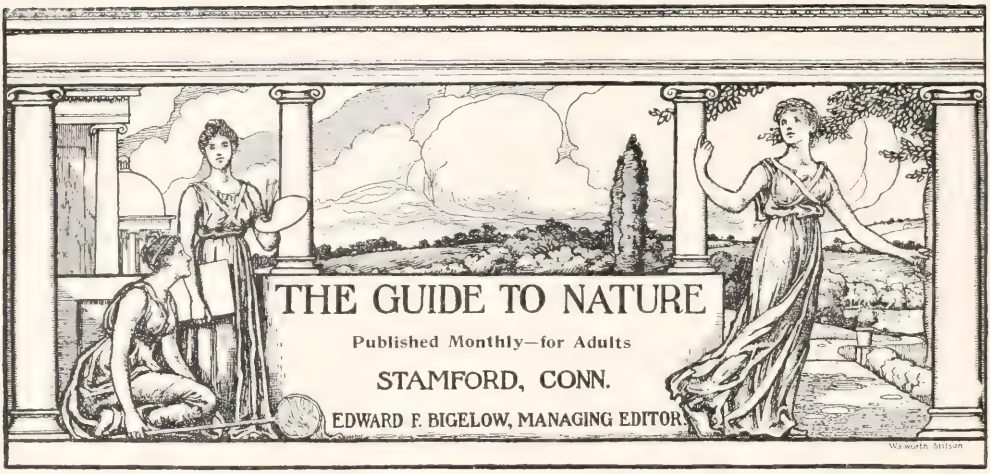
Herewith is an illustration of a natural park owned by Mr. Phillip Dewey, near New Richmond, Indiana. He is a wealthy farmer and enjoys taking care of his herd of elk which contains some very fine specimens. Mr. Dewey takes great pleasure in showing his pets to his visitors and always calls them up and feeds them a little when visitors call.

The park is a beautiful place fenced off from his other stock and in the rear is quite a large hill covered with large oak and maple shade trees, making a natural home for the elk.

Mr. Dewey was very courteous and did everything possible to help get a good photograph.



THE ELK ON AN INDIANA FARM.



ARCADIA.

"What's in a name?"

Everything in the name "Arcadia" implies and expresses exactly what the new nature "settlement," "colony" or "village" purposes to do.

Arcadia is generally known as a place where simplicity and happiness reign together in harmony with a pastoral and natural life and where all live close to the heart of nature. The original Arcadia was pervaded by the spirit of Pan, so named by the other gods because he was the god of all nature and referred to as "the child of heaven and earth."

So Pan (a synonym for Arcadia) is thus described by Servius:

"He is a rustic god, formed in similitude of nature, whence he is called Pan; i. e., *All*; for he has horns in similitude of the rays of the sun and the horns of the moon; his face is ruddy, in imitation of the ether; he has spotted fawn skin upon his breast, in likeness of stars; his lower parts are shaggy on account of trees, shrubs and wild beasts; he has goat's feet to denote stability of the earth; he has a pipe of seven reeds on account of the harmony of heavens; he has a crook, that is a curved staff, on account of the year which runs back on itself, because he is the god of all nature." (Anthon's Classical Dictionary.)

Could we have a better ideal than Arcadia or a better spirit than that of Pan to be its governing influence?

Then, even in the minor sense, ours is the true Arcadia. Says the Universal Encyclopedia, "The Arcadians were a simple people, inferior to most of the other Greeks in genius and culture. This country was a favorite of ancient pastoral poets who praise the peaceful and happy life of the Arcadians."

Figuratively our "genius and culture" may be less than that of "the other Greeks." We do not purpose even to attempt the more elaborate work of the more technical Institutions, Laboratories and Associations. Nevertheless, mingled with our main purpose to popularize nature and natural science in the facts already known to technical scientists, we shall strive also to add to the sum of human knowledge of natural facts. Our views of nature may bristle with fewer sesquipedalian words and we may not generalize biological figures to the tenth decimal place; but we do hope that all lovers of nature will sing the praises of "the peaceful and happy life" of those who shall live near to the heart of nature beneath the fair skies and within reach of the fragrant breezes of Arcadia.

The Standard Dictionary says of Arcadia, "Any place where ideal rustic simplicity and content prevail." The definer must have had in mind the Arcadia of nature.

That is to be the dominant idea of the new nature Arcadia. With an equipment of astronomical observatory, biological laboratories, greenhouse, experimental rooms, houses for our pet animals, insectary, photograph gallery, "clearing house," offices for correspon-

dence, rooms for students, facilities for printing and publishing, it will in addition contain everything needed for the guidance of those who may need its aid. While we shall hope to add somewhat to "professional" knowledge, our chief exertions and sympathies will be with the amateur naturalist and the young scientist; with the boy and the girl who has seeing eyes and the inquiring spirit; with the teacher of nature study who is afraid of the "I don't know" bugbear; with the professional or the business man or woman who seeks an hour's recreation in garden or greenhouse or with wild nature as a respite for tired nerves. Our field will extend from nebulæ to diatoms and will be for people young, middle aged or old.

Arcadia is not an entirely untried experiment. It is a step (a long step) forward with a greatly enlarged view in a field in which the writer has been working for almost a quarter of a century. With increased facilities, more assistants, a wider horizon, we hope to do more and better work, to be a more efficient guide in any realm of nature or of natural science. To that end, a cordial invitation is extended to you to share in this work and to enjoy its achievements.

The possibilities of Arcadia, the extent of the guidance, will be what we all working together shall make them.

GUIDANCE.

Occasionally some of our best friends and most appreciative subscribers will question our wisdom in selecting THE GUIDE TO NATURE as the name for this magazine.

It has been several times suggested that we call it "Nature." One veteran scientist says he is too proficient to longer need a "Guide" but will always be interested in "Nature." From personal acquaintance with that scientist, I am confident that he is far from maintaining even an approach to omniscience in the affairs of nature. What he meant to say was that he has learned where the fields are and how to walk in the paths of exploration. In that sense he needs no "guide." But he and those of his kind are exceptions differentiated from the majority of mankind by years of technical and persistent study.

Even he now admits that this magazine is valuable on account of the material which it publishes and no one is more ready than he to admit that there are yet many realms of nature still unexplored.

All of us must admit that these unexplored realms exist and most of us will agree that we need aid in approaching them, especially if the help come from those experienced in the exploration of other and similar regions.

Every boy and girl realizes that there is plenty to learn (and the realization becomes more distinct with more knowledge); every teacher realizes the value of "nature study" in the schools, but some hesitate to begin the work because the wealth of material is so great or because from lack of definite "guidance," they are unable to make any of that material available. For boys and girls this has been the dominating idea in my work in the "Nature and Science" department of "St. Nicholas" to show the attractive fields and to give guidance therein and only to such an extent as to make the explorations profitable and pleasurable. The same idea pervades THE GUIDE TO NATURE for older persons. It is to give to him who does not know, yet who desires to know, just enough of suggestion to aid, to attract and to lead onward, and yet not enough to overwhelm with help nor to deprive him of the charm of original discovery. We aim to assist by suggestion and by guidance rather than by definite and positive instruction.

We desire to be a guide, a signboard, made attractive and pleasing by every means within our power. THE GUIDE says, "Stop, Look, Listen," but do those things for yourself. THE GUIDE cannot stop nor look nor listen for you. We point out the road. You must do the rest, if you will, if you feel any interest in the result which can never be any other than praiseworthy.

We want articles and illustrations of original investigations, not of emotions and aspirations. The first article in this number is a good example of what is wanted. That shows real study.

OUR CONTRIBUTORS.

In the prospectus of THE GUIDE TO NATURE it was announced that for the leading articles, that is for contributions other than reports in "The Agassiz Association" department, and letters in the department of "Correspondence and Information," would be paid for by a small amount of cash.

It was not intended that the trifling sum should in any sense be considered an adequate nor a just remuneration to those competent to write an article for this magazine, but it was stated that the small amount would make the editor feel freer to return those MSS that should not come within the scope of the magazine, or that for any reason he should find to be unavailable. The editor has now come to the conclusion that that announcement was a mistake and it is hereby withdrawn.

The small amount put some of our most acceptable contributors, as viewed by the less competent, in an unpleasant light, and the reader, who knew how small the remuneration was, smiled perhaps, and decided that his own essays and observations, being strictly original and having considerable value, should not appear in THE GUIDE, but should go where the magazine is more wealthy, and the editor more appreciative or generous, or both. The fact, as seen from the editor's office-window is that our best contributors write solely for the good of the cause, and if they were to receive payment in any way commensurate with the value of their work, that would be at least twenty times more than THE GUIDE TO NATURE could possibly afford. Therefore let us come out frankly yet positively and have no "make-believe" payment. The editor intends to be perfectly candid in the future, and to tell any nature student whether or not his contribution comes within "the scope of things terrestrial," and he will feel perfectly free to retain or to return any contribution on the merits of the matter, and not on the basis of any trifling cash remuneration, as an encouragement of budding genius, or to youthful observers who are willing to try their "prentice hand" on contributions for THE GUIDE, with more thought for the cash than for the cause, or for the literary merits of the article, to say nothing of the correctness of the detailed observations.

In making this decision the editor feels that he is occupying the fairest and frankest position possible toward his contributors, as well as toward himself and other interested persons. In the future every reader will know that the writer did not supply his paper for what he could get, but freely gave it for the good of the cause.

If THE GUIDE TO NATURE were published for the purpose of getting money for its editor and its other directors, it would be as generous to its contributors as should be possible, or as any other first-class magazine, and distribute cash payments with as much satisfaction as dividends. But we are not laboring to gather gold. As has several times been explained and repeated, the entire work is a labor of love. No officer receives one cent of pay. Each one labors for the good of the cause. Those who are naturalists should be the most eager, and I believe are the most eager, to contribute to this work in any way within their ability. It should be easier and a real pleasure to any earnest naturalist to give to others the benefit of his experience and observations.

This magazine must stand or fall on the support or non-support of enthusiastic naturalists and others who realize that naturalists are doing a commendable philanthropic work in pointing out to the general public the interesting and beautiful things in nature and that these are a factor of importance in benefitting and uplifting humanity, and in making life worth living.

ABOUT THE DEVIL-FISH.

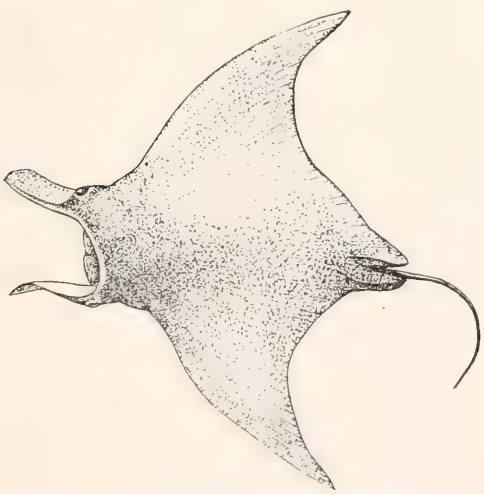
The bringing together of many interesting facts hitherto known only to a few scattered men of science about the generally-dreaded devil-fish, has been the result of an authoritative study of the subject recently completed by Dr. Theodore Gill, Associate in Zoology in the U. S. National Museum.

Doctor Gill has summarized his studies in an official publication just issued by the Smithsonian Institution, of which the Museum is a branch.

Although the name devil-fish has often been applied to different species of cuttle-fish, with their eight long wavy arms, to a kind of shark, and also in California to a gray whale, the giant fish best known as such is technically called the great ray.

The devil-fish, or great ray, is flat, said to be sometimes 30 feet across, with two great supple arms or head-fins shaped somewhat like elephants' tusks protruding from the front of its head. Although many thrilling tales of adventure with this fish have from time to time found their way into print, there is not yet on record an authoritative report of a devil-fish having ever eaten a human being.

"The food of the devil-fishes," says Doctor Gill, "so far from being large animals and occasionally a man or so, as has been alleged, appears to be chiefly the small crabs, shrimps and other crustaceans, and young or small



THE DEVIL-FISH.
From a photograph.

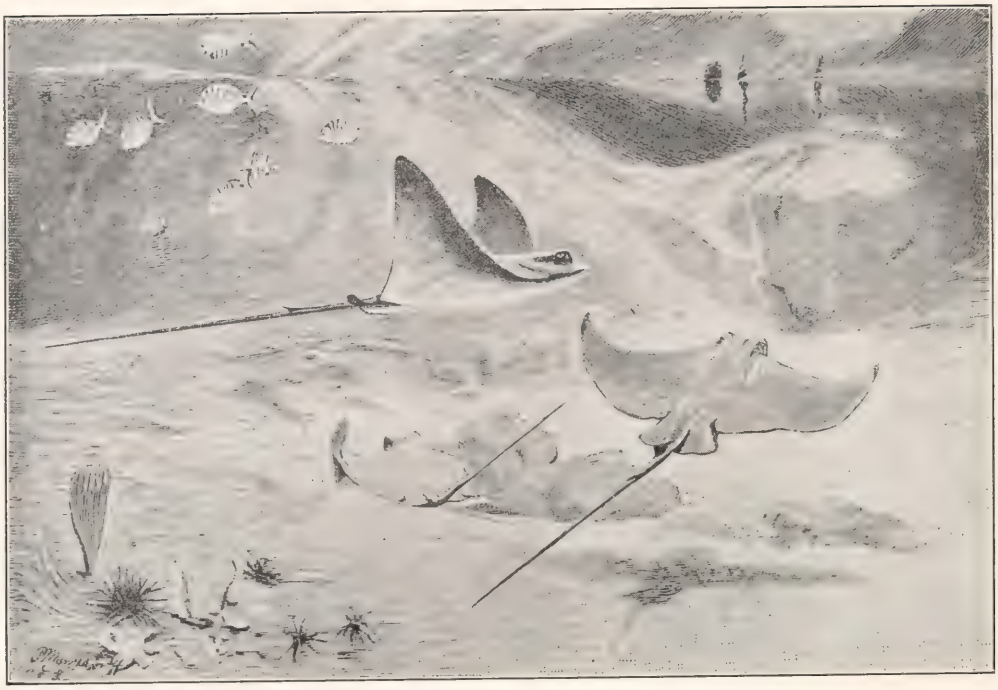
fishes, which swarm in certain places near the surface of the water. Rarely does one prey on large fishes."

The devil-fishes are inhabitants of warm-water seas and as a rule do not venture from the shore very far out on the high seas. Once in a while one is seen as far north as New York or another in the Mediterranean. In United States waters they have been more frequently reported from South Carolina and the Gulf States and from Lower California. They often swim in schools, or shoals, and have a curious habit of turning somersaults near the surface, sometimes leaping as high as ten feet out of the water and churning the sea into foam. If the devil-fishes could live and move in the air, in their mode of progression, they would probably be said to fly, for a sort of submarine flight is really what is accomplished. It is by flaps of the long wing-like fins that they speed themselves along.

A naturalist who observed devil-fishes in action, says that he thought no more diabolical creature could be imagined. They resembled enormous bats, and in following one another around in a circle, raised the outer tip of one of the long wing-like fins high out of the water in a graceful curve, the other being deeply submerged. They might be seen now gliding down with a flying motion of the wings; sweeping, gyrating upward with a twisting vertical motion marvelous in its perfect grace; now they flashed white, again black, so that one would say they were rolling over and over, turning somersaults.

While swimming along the two great arms or feelers of the devil-fish are whirled about in constant motion like the tentacles of a squid. When these tentacles come in contact with anything they close upon it. It is generally believed that this clasping, although at times doing considerable harm to fishermen and their boats, is largely automatic, and that upon the whole the devil-fish is a timid, rather than a fighting animal.

It is hard to believe, however, that the devil-fish is always timid, when it has been known "to weigh a ship's anchor, and run with the vessel a league or two, and bring her back, against tide, to almost the same place," nor can the devil-fish generally be said to be so accommodating. Nevertheless, running off with vessels is not an infrequent occurrence in connection



EAGLE-RAYS IN MOTION (AFTER MANGELSDORF).
Very similar to the devil-fish, showing method of "submarine flight."

with the devil-fish. One case is on record where a shoal of devil-fish, sweeping by at flood tide, approached so near the shore as to come in contact with a water fence, the firm posts of which they seized and tried to tear up till they lashed the water into a foam with their powerful wings.

It is a peculiarity of the devil-fish that instead of laying many thousands or even millions of eggs, it normally has only a single young one at birth. It appears, however, that to properly reproduce the species, only a single young one is necessary. For a baby devil-fish, sometimes being as broad as five feet and weighing twenty pounds or more, is well able to take care of itself. In a number of respects the young fish grows up under nursing and training remarkably like that of a human being. It is nourished, for instance, from its mother's "milk."

Nor sight nor sound but has the freshness of novelty, and one rambler, at least, in his maturer years is still a boy at heart.—Abbott.

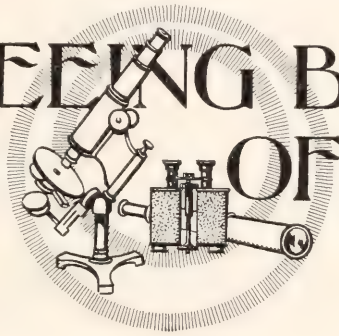
THE DEATH OF LEAVES.

It is pleasant to walk over the beds of these fresh, crisp, and rustling leaves. How beautifully they go to their graves! how gently lay themselves down and turn to mould!—painted of a thousand hues, and fit to make the beds of us living. So they troop to their last resting-place, light and frisky. They put on no weeds, but merrily they go scampering over the earth, selecting the spot, choosing a lot, ordering no iron fence, whispering all through the woods about it,—some choosing the spot where the bodies of men are mouldering beneath, and meeting them half-way. How many flutterings before they rest quietly in their graves! They that soared so loftily, how contentedly they return to dust again, and are laid low, resigned to lie and decay at the foot of the tree, and afford nourishment to new generations of their kind, as well as to flutter on high. They teach us how to die. One wonders if the time will ever come when men, with their boasted faith in immortality, will lie down as gracefully and as ripe,—with such an Indian-summer serenity will

shed their bodies, as they do their hair and nails.

When the leaves fall the whole earth is a cemetery pleasant to walk in. I love to wander and muse over them in their graves. Here are no lying nor vain epitaphs. What though you own no lot at Mount Auburn? Your lot is surely cast somewhere in this vast cemetery, which has been consecrated from of old. You need attend no auction to secure a place. There is room enough here. The Loose-strife shall bloom and the Huckleberry-bird sing over your bones. The woodman and hunter shall be your sextons, and the children shall tread upon the borders as much as they will. Let us walk in the cemetery of the leaves,—this is your true Greenwood Cemetery. —Henry David Thoreau in "Excursions."

SEEING BY AID OF THE LENS



WONDERFUL TONGUES OF FLIES.

The tongue of the common fly, often called the proboscis, is a wonderful organ of great interest to the microscopist who is fond of studying the little things of nature, and of more than a great interest to the fly itself, for it is by this tongue that the insect gets its living. The form, and often the structure, differs in the different kinds of flies while the general resemblance remains somewhat similar in all. Fig. 1 shows the highly magnified tip of the blow-fly's tongue; Fig. 2 that of the common house fly, where the entire length of the proboscis is pictured with two "feelers" at the rear, one on each side. Here the general resemblance in form is readily seen, although to the microscopical anatomist the differences are nearly as conspicuous. But in Fig. 3, which shows a part of the drone fly's tongue, while there is some resemblance in structure, the shape is entirely different from that of the other two. A long list with an album full of pictures might be made of these little parts of a single large group of insects, and would prove of much value for comparison.

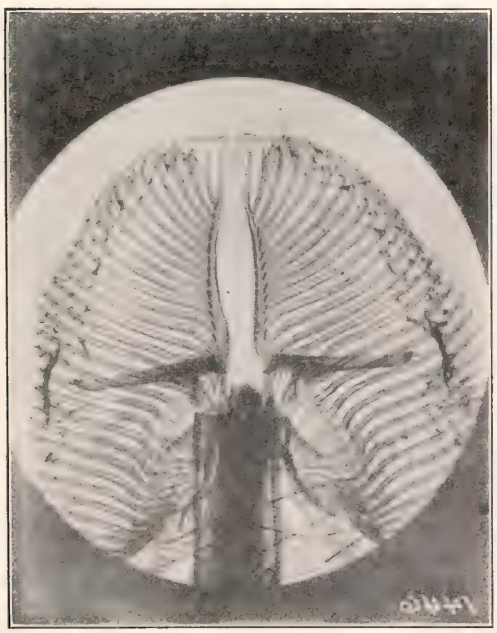


FIG. 1. TIP OF BLOW-FLY'S TONGUE.

In the flies which do not bite nor pierce, the organ is composed chiefly, as shown in the illustrations of what seem to be nearly parallel rows of tubes, but which, in reality, are split along their entire length and thus form

what may be called half-tubes. This may be seen in Fig. 1, where the two edges of the split tube are defined by what appears to be a saw-tooth margin, a delicate arrangement that the microscope explains.

Flies with these soft tips to their tongues live, for the most part, on liquid food, although they do get a part of their nourishment from solid materials that they scrape with their teeth, for a fly has teeth, carrying them at the base of the tongue, some owning three rows, broad and flat, and each with its free margin cut into one or more sharp, saw-like points.

The tip of the tongue (Fig 2) has two parts or lobes separated by a clear space. At the rear of this space, on both sides between the split tubes there are, as the photograph shows, six teeth. In Fig. 1 the teeth are visible in three rows on each side but of a different form. It is with these that the fly scrapes the solid food which it eats. The surface of some hard objects, such as loaf sugar, hard cake, even varnished wood, sometimes shows parallel scratches made by flies' teeth.

The fly's food must be very finely pulverized, or preferably in solution, so that it may pass through the split tubes and onward to the stomach. To soften the hard food, the fly exudes a great flood of saliva through the half-tubes of the tongue, dissolves the surface of the sugar or other substance, or scrapes it with the teeth when the saliva is withdrawn, carrying with it the sugar or the minute particles.



FIG. 2. TONGUE OF HOUSE FLY.



FIG. 3. PART OF DRONE FLY'S TONGUE.

That flies, disturbed from the dishes on our own tables, may leave drops of their saliva for us to swallow is not a pleasing thought, but it is true. We are just beginning to learn that they are dirty creatures, and that the filth which they may carry from one place to another may become a source of danger to us or even of death. But this need not detract from the interest in the structure of these tongues, which are an admirable bit of Nature's handiwork.

MAKING PHOTOMICROGRAPHS.

THE GUIDE TO NATURE has extensive facilities for making photographs of microscopic objects. This can be done even from temporary mountings, if the specimen is sent in good condition.

Correspondence solicited regarding work in special investigations.

POPULAR ASTRONOMY

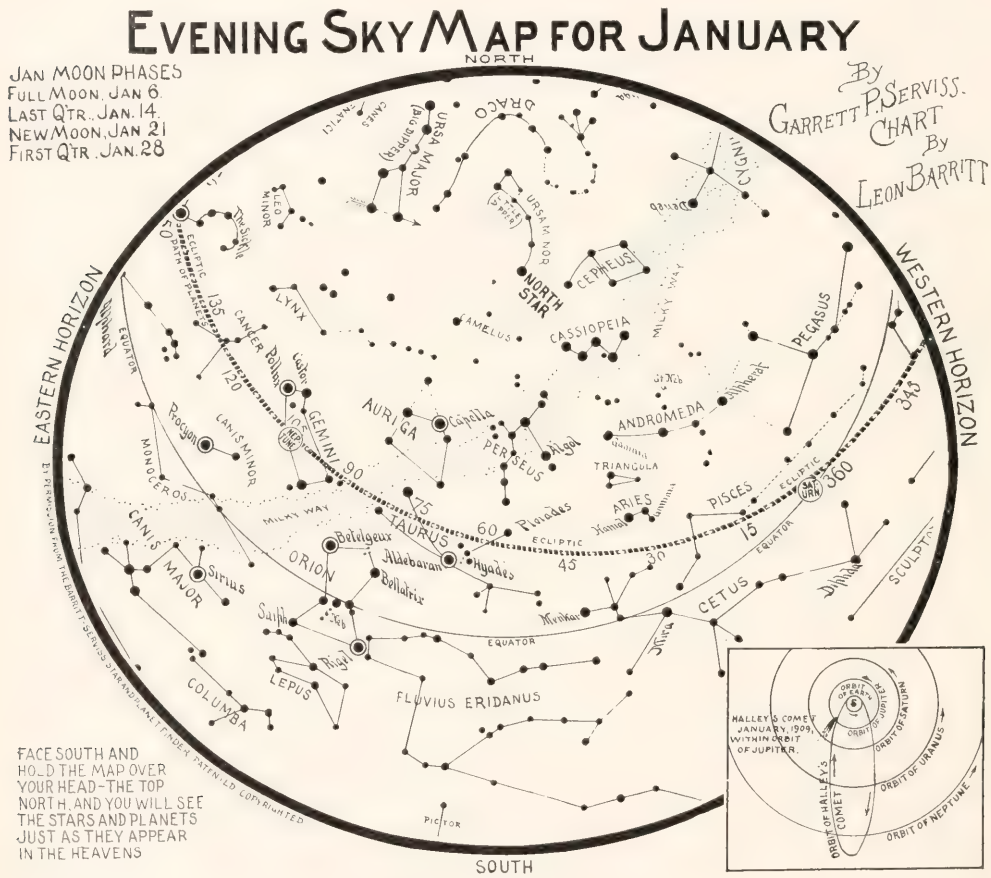
THE HEAVENS IN JANUARY.

BY GARRETT P. SERVISS, BROOKLYN, N. Y.

The keynote of astronomy in the present year is furnished by the approaching return of the great comet of Halley. That comet will not be in perihelion, i. e., at its nearest point with regard to the sun, until May, 1910, but during this year it will come into sight, and every observatory in the world will be busy studying it. The preparations for this great astronomical event have already, for a long time, been going on, because it is an unparalleled thing of its kind. For this reason we give in a corner of this month's chart a little diagram showing the orbit of Halley's comet and the position which the comet occupies at the present moment. It is now about as far from the sun as the planet Jupiter, and if it were a large solid body like Jupiter it would already be plainly visible to the naked eye. But a comet is not a solid body, although it is probably made up of solid particles, and only when it gets near the sun does it begin to display its characteristic features. Then only is the wonderful tail unfolded to amaze all beholders. The tail of a comet is believed to consist of immeasurably minute particles which are shot off from the head, or nucleus, by some repellant force emanating from the sun. Recent investigations seem to prove that this force is electric in its nature. It has also been thought that the "push" of the light waves from the sun may play a part in the phenomenon for strange as it may seem, it is now known that the waves of light are able to drive before them excessively small particles of matter which they may encounter. The idea is that the heat and perhaps the electromagnet action of the sun on the approaching comet have the effect of releasing infinitesimal particles which are then driven away by the flowing light waves (which travel 185,000 miles per second) like dust before a high wind. The certainty that the sun exerts a repellent force of some kind is sufficiently established by the well-known fact that the tail of a comet always points away from the sun, changing its direction as the head of the comet passes around the sun so that the tail always remains on the off side. The reason why the return of Halley's comet excites so much attention from astronomers is because it is absolutely the only really great comet the period of whose revolution and the date of whose returns are known. It comes back once about every seventy-six years. It was seen in the time of Sir Isaac Newton, and then Halley, who in this respect outstripped Newton, detected the fact that it was a periodic comet and predicted its return in 1758. Halley was dead long before the comet got back, but back it came as he had predicted. The next return was in 1835. The present return is the third since the days of Newton. Just at what moment it will be caught sight of nobody can tell. That fact gives special zest to the search. There is some hope that photography may reveal it some time this winter, for very faint objects are frequently caught in that way before they become apparent to the telescope. As soon as it becomes visible its course through the sky will be represented on our monthly charts. Halley's comet during some of its returns in the past was a very startling object, spreading terror all over the world. It was visible at the time of the Norman conquest of England, and it has recently been shown that its appearance on the present occasion will be strikingly similar, as far as the conditions of visibility are concerned, to that which it presented in 1066. Its period varies to the extent of several years on account of the disturbing

attractions of the greater planets, especially Jupiter and Saturn, near whose orbits it passes.

Saturn is the only planet to attract attention in the evening sky this month. Mercury, which is now east of the sun, setting before the hour for which the chart is drawn, and being too near the sun as yet to attract attention. Although Geneva (Switzerland) Observatory. There is nothing improbable, however, in the discovery, because there is reason to think that the rings of Saturn are gradually going to pieces, and that process would naturally produce the appearance of faint new rings surrounding the old ones. The other planets are all in the morning sky just now. Venus was very



Saturn's rings are not to be seen without a telescope the planet itself is always interesting to look at, for it does not resemble the fixed stars in appearance, and with its steady, unflickering light may be regarded as a typical planet. The announcement, which was mentioned last month, that there is a new, or at least a hitherto unnoticed ring surrounding the bright rings of Saturn remains at present unconfirmed. The alleged new ring has only been seen by an observer at the brilliant there during the late fall and early winter and drew many inquiries from people who saw her, and, being astonished by her brightness, could not imagine what she was. One of the objects of these monthly articles and charts is to enable those who are not familiar with the heavens to recognize such phenomena. Their wonder at the beauty and grandeur of the sky will not be diminished, while their knowledge and satisfaction will be largely increased.

THE STARS AND CONSTELLATIONS.

Every eye is now drawn irresistibly to the great constellation Orion, situated about an hour east of the meridian. The rising of Orion is one of the most imposing spectacles that the heavens afford. In ancient times the appearance of this constellation was always associated with the coming of the season of storms and tempests. Hesiod wrote:

"——then the winds war aloud,
And veil the ocean with a sable cloud."

The splendor of his two great first magnitude stars, Rigel in the foot and Betelgeuse in the shoulder, is alone enough to make this constellation a cynosure for all eyes, to say nothing of the marvelous beauty of the three matched stars that form the belt of the imaginary giant. High above, toward the West, blazes the bull, Taurus, with the gleaming cluster of the Pleiades shaking upon his flank and the red Aldebaran aflame in his eye as he rushes down upon Orion. Lower than Orion in the East appears the unrivalled Sirius in the mouth of the Great Dog, who follows after Orion. As one looks at the brilliant "Dogstar," flashing all the colors of the spectrum, one cannot help recalling the remarkable history of that star which was worshipped on the banks of the Nile long before Rome had been heard of, and in whose honor were erected temples whose magnificence and magnitude produce astonishment even in this age of architectural extravagance. Directly in the South, flowing first westward from the foot of Orion and then turning eastward, is Eridanus, the "River." Its stars are so arranged that they produce unmistakably the appearance of a stream in the sky. Away over in the West appears Cetus, the Whale, one of the most extensive of the constellations, but containing few stars bright enough to attract special attention. The Great Square of Pegasus, with Saturn below it, is half way down the western sky. Running eastward from the corner of the Square is the row of second magnitude stars which mark the figure of Andromeda. East of Andromeda comes Perseus, and southeast of Perseus, buried in the Milky Way, appears Auriga, ornamented with the great white star Capella. Capella is directly north of Orion, and about half way from the head of that constellation to the Pole Star. Southeast of Capella come the Twins, Gemini, with the brilliant Procyon, in Canis Minor, below them. Still further down in the East, below Gemini, is Cancer, the Crab, remarkable for its glimmering cluster called the "Manger." The Great Dipper, in Ursa Major, stands upright on its handle low down in the northeast, while Cassiopeia, which always swings round the pole directly opposite to the Dipper, is high up in the northwest, above Andromeda.

"From all quarters," wrote the Greek poet Aratus, whom St. Paul quoted, "the Heavens speak to Man," and surely at no season do they speak more plainly or more eloquently and imposingly than at this season, when they are ablaze with their brightest brilliants.

At the beginning of January the earth is in perihelion, or at its point of nearest approach to the sun. We are now 3,000,000 miles nearer the sun than we were in July, and yet it is winter for us, simply because the Northern hemisphere now leans away from the sun, so that its rays fall slopingly upon us here, and are consequently spread over so much greater an area that their heating power is less. In the Southern hemisphere the case is exactly reversed, for there the sun's rays now fall more perpendicularly, and a proportionately greater number of them are spread over a given area of the earth's surface. Perpetual night now reigns at the North Pole and perpetual day at the South Pole.

How many have the gift of seeing things? This faculty may be cultivated as well as the memory, and to better advantage. That man who can discover some original beauty and verity for himself, see it with his own eyes and not through the eyes of another, is not without resource so long as he live.—The Ministry of Beauty, Kirkham.

THE CAMERA

PHOTOGRAPHS OF TWO WATERFALLS

BY HERBERT M. FLORA, MADISON, INDIANA.

Clifty Falls are four and one-half miles northwest of Madison, Indiana, where there is a splendid summer resort frequented by thousands during the season. These falls are a most beautiful sight, the water falling in a great broad sheet for ninety-four feet.

Tunnel Falls are situated about three miles northwest of Madison. These beautiful falls are almost inaccessible but it is estimated that the fall of the water is between eighty and eighty-five feet.



CLIFTY FALLS.
Ninety-four foot fall of water.



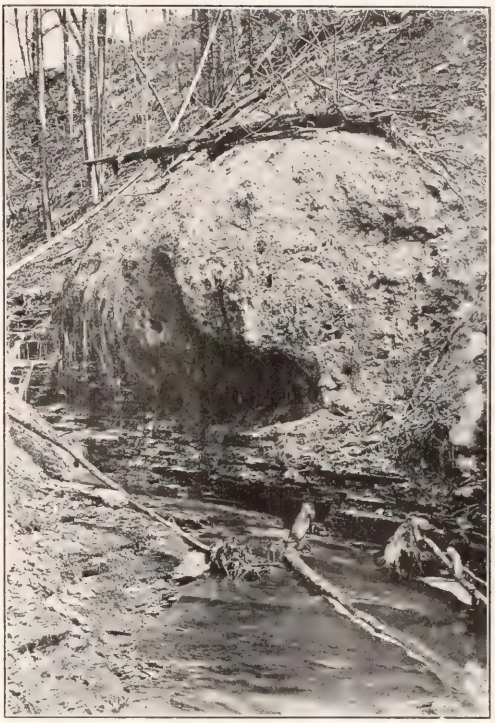
TUNNEL FALLS.
Eighty-two foot fall of water.

INTERESTING EXAMPLE OF EROSION.

BY GEO. W. KELLOGG.

The workings of opposing natural forces, destructive and constructive, are illustrated in the picture. A small stream, cutting its bed through limestone, has bisected a subterranean passage, the conveyor of underground drainage containing a considerable amount of mineral matter in solution; and by precipitation and evaporation at the outlet thus formed, there is being builded from the deposits of mineral matter the mass shown herewith. The upper surface has the appearance of a huge boulder, but beneath the mass is more

like an immense sponge with hundreds of pores, from which in tiny streams the water escapes from its underground prison. This mass is the distinguishing feature of one of the numerous small ravines in the vicinity of Rochester, N. Y., and, though accessible without great effort, being within a half mile of a trolley station and but a few hundred yards of a public highway, its visitors are few, and its being is not generally known even to those whose inclinations are in the direction of the natural and scientific.



THE INTERESTING EROSION.
In ravine at Rochester, New York.

THE TESSAR AND PROTAR.

(Published to answer the inquiries as to differences between the two lenses.)

When called upon to choose between those two estimable lenses—the Bausch & Lomb Zeiss Tessar and the Bausch & Lomb Zeiss Protar—the naturalist has before him a problem which is rather difficult of solution. Indeed the solution depends upon the kind of camera in use and the work to be done, each case having to be considered individually.

Both series of lenses are constructed from the famous Jena glass, and are made equally precise in all details. The corrections for astigmatism, for chromatic and spherical aberrations are equally perfect, and the faithfulness with which every point is delineated upon the negative is in all respects identical with the two series. Optical perfection, therefore, and mechanical workmanship are as wonderful in one case as the other.

Let us first consider one of the principal differences, that of convertibility. The Tessar, both Series Ic and IIb, is an unsymmetrical lens composed of four elements which are divided into two groups by the diaphragm. The front lenses are separated by an air space which acts as a lens, while the rear elements are cemented. Neither of these two dissimilar groups is optically corrected, but the two when used in conjunction exactly balance each other's faults, thus producing a perfect lens. The Tessar, therefore, must be used in its entirety. And the components of the two Tessars of different focal lengths cannot be combined to produce a doublet. On the other hand, the Protar is so constructed that each of the doublets is composed of two elements, either identical or not, which may be used as individual lenses. This construction gives in the case of the symmetrical lens a doublet, the focal length of which is much shorter than either of the components, while the single lenses may be used as such. When the elements are dissimilar in their focal lengths, three lenses are in reality at command; the single lenses being of different focal length give different size pictures of an object from a given point and when combined produce a perfect doublet. Further, another cell may be added to the first two, resulting in three single lenses and three doublets, or six different focal lengths all told.

But with this advantage there is a disadvantage as regards speed—that is, some of the doublets will require longer exposures than others, while all of the single lenses work at an aperture of f-12.5. When the doublet is symmetrical the speed attainable is f-6.3; when

unsymmetrical the speed is f-7 or f-7.7, depending upon the differences in the focal lengths of the two parts. As opposed to this we have the speed of f-6.3 in all sizes of the Tessar Series IIb, and the marvelous speed of f-4.5 in all sizes of the Series Ic. This question of speed is of utmost importance to the naturalist, who frequently desires to make negatives of animals in their natural habitat where the work must be instantaneous and yet the light conditions are not always the most favorable. For such work the Tessar Ic is absolutely unsurpassed.

Cameras limit the use of lenses in two directions. First as to their size and second as to their focal lengths. For instance, one may desire to use the Tessar Ic, and yet the camera which he employs may be so small that the front board will not contain the objective. In such cases the Tessar, Series IIb, should be employed if the convertible lens is not wanted. Again, the Convertible Protar may be desired in cases where the bellows draw of a camera is so short as to render useless the single elements. In this case a symmetrical Protar or a Tessar would be best.

Another consideration is that of cost and is mentioned here only to show that the Convertible Protar, while apparently the most expensive, is in reality the cheapest Anastigmat, possessing such superb qualities, that has ever been produced. When using three single elements giving six focal lengths it is but fair to divide the total cost by six, resulting in an average of a little over $17.00 each for Anastigmats of the highest optical correction. And if another single lens be added the result is four single and six doublet lenses at a cost of about $15.00 each.

It will thus be seen that but little can be done to actually decide what lenses the naturalist should select. He must consider the qualities possessed by each objective and decide for himself upon those which he can omit. The Bausch & Lomb Optical Co., of Rochester, N. Y., will be pleased to render whatever assistance they may be able in solving the individual problems of those interested.



PHOTOGRAPHIC STUDY OF PLUMOSE TAILS OF CLEMATIS.

THE AGASSIZ ASSOCIATION

IMPORTANT GOOD NEWS

FOR

All Students and Lovers of Nature

THE ESTABLISHMENT OF

"ARCADIA"

A philanthropist (whose name is withheld for the present by request) is to establish "Arcadia," a nature colony or nature university on unique and original plans. Within an enclosure in courtyard style, covering more than a half acre of ground, will be erected a series of convenient buildings for the work of experimenting in growth, care and habits of plants and animals; for preparation of literary and illustrative material; for imparting information to amateur and professional naturalists of all ages; for aid in "nature study" in the schools; for the exchange of natural history specimens; for publishing, etc. In brief, it will be an institution for creating and increasing a knowledge and love of nature.

The buildings will consist of:

1. The Home of The Agassiz Association—offices and exhibition, lecture and demonstration rooms.
2. Astronomical observatory.
3. Photograph gallery with dark room and all equipments.
4. The "AA Clearing House" for storage and dissemination of nature study material.
5. Biological laboratories.
6. Insectary with especial reference to honeybees.
7. Greenhouse.
8. Chicken house and yard.
9. Pigeon house and flying cage.
10. Pet stock house and also other minor buildings.

There will also be vivaria, aquaria, plant beds, etc.

Contracts for the entire plant have been awarded and the work is in progress and the outfit will be ready for occupancy April 1. The buildings are of a temporary and portable nature and the entire outfit is tentative for a period of two years. The giver has placed all in the hands of Edward F. Bigelow for the benefit of the young people he reaches in "Nature and Science" of "St. Nicholas," of which he is editor; for doing

the work of The Agassiz Association (in the one building provided and known as the "AA Home") of which he is President; for pedagogical departments in various teachers' magazines; for articles and illustrations for adults in THE GUIDE TO NATURE and other magazines.

To summarize,—the publications shall be:

For young folks—"St. Nicholas" magazine.

For adults (the "general public")—THE GUIDE TO NATURE and other publications of The Agassiz Association and also articles in the general magazines.

For teachers—pedagogical departments of AA in various teachers' magazines.

The tests for the success of this nature institution during the two years shall be:

1. Increased interest in the various publications.
2. Co-operation of naturalists and general public.

No provision is made for the expense of assistants, experiments, photography and other operating expenses.

Personal.

I appeal for assistance in expenses of operation and in proving the appreciation of the entire plan:

1. Gifts of money or of specimens, cabinets, etc.

2. Increased interest in "Nature and Science" of "St. Nicholas." The information bureau or "Because-we-want-to-know" department is free to all young folks. Young naturalists also write telling of observations. (Subscriptions to "St. Nicholas" may be sent direct to The Century Company, Union Square, New York City, or to the undersigned. Three dollars a year; twenty-five cents a copy. Circular upon application.)

3. Subscriptions to THE GUIDE TO NATURE" (for adults). (One dollar and fifty cents a year; fifteen cents a single copy.)

4. Subscriptions to teachers' magazines in which pedagogical articles or departments of the AA are published. Particulars on application.

5. Contributions of articles and photographs. Those accepted for "Nature and Science" will be paid for.

6. Aiding Memberships in The Agassiz Association as follows:

Aiding Memberships.

$5.00 paid annually constitutes a person a Sustaining Member.

$100.00 paid at one time constitutes a Life Member.

$1,000.00 paid constitutes a person a Patron.

$5,000.00 paid constitutes a person a Founder.

$25,000.00 paid constitutes a person a Benefactor.

A list of trustees and corporators is published in the following article. We believe that the work of this Association is MOST IMPORTANT, in education and recreation.

If an increased interest in my work and that of my associates is manifested in any or all of the above lines in the next two years, the donor of this tentative plant proposes to erect at the end of that time a series of large fireproof buildings and to more extensively equip them for promoting a popular knowledge and love of nature.

I make this appeal in full confidence that any man, woman, youth, girl or boy with any interest in professional or

amateur nature study or natural science will aid me in this greatest project of extending nature interests. I appeal to every scientific society, magazine and newspaper to render some aid in this great project. So far as it specifically is concerned in its principal point of view, The Agassiz Association, my services are free. My income is from "St. Nicholas," lectures and teaching.

EDWARD F. BIGELOW.

Stamford, Connecticut.

THE NEW AA BOARD OF TRUSTEES.

For almost two years the executive office of The Agassiz Association has been in Stamford, Connecticut, but the headquarters of the Association have remained in Pittsfield, Massachusetts, where the Society was incorporated in 1892, under the laws of that state.

At a meeting of the Corporators and Trustees, held in the Berkshire Athenæum, Pittsfield, Massachusetts, December 15th, six new Trustees were elected and resignations were received from all of the old Board except three. The new Board consists of nine of which five are residents of Stamford, Connecticut. The headquarters at that meeting were transferred to Stamford by election of a treasurer and a secretary from the Stamford residents. The books and seal were transferred to that city.



HARLAN H. BALLARD
Pittsfield, Massachusetts.
Originator of AA and President 1875 to 1907.



EDWARD FULLER BIGELOW
Stamford, Connecticut.
President of AA since April, 1907.

An adjourned meeting of the new Board was held at the office of the new secretary at Stamford, December 17th, 1908. At this meeting the following resolution was adopted:

"Resolved, that the permanent headquarters of The Agassiz Association be and they are hereby established in Stamford, Fairfield County, Connecticut, and that the President be requested to give the information to the public press and to make such statements as shall seem best designed to promote

the welfare of The Agassiz Association and to solicit the co-operation and financial support of all good citizens."

The question of the incorporation of the AA under the laws of the State of Connecticut was considered and the President was instructed to take such steps as may be necessary to accomplish that purpose.



HIRAM E. DEATS.
Flemington, N. J.
Business Adviser of AA.

Mr. Deats is one of our most enthusiastic workers in advancing the interests of the organization. He has given over Five Thousand Dollars to advancing the work. For over a quarter of a century he has devoted much time, correspondence and many specimens "for popularizing knowledge and love of nature among young and old." He is an excellent example of a "stick-to-it," of retaining youth by continued enthusiasm, of love and sympathy for young folks and of a positive belief in the uplifting and educational value of nature interests.

Voted to adjourn, subject to the call of the President.

The new Board, to be reincorporated under the laws of Connecticut, consists of the following:

Edward F. Bigelow (naturalist-editor-teacher), Stamford, Connecticut, President.

Harlan H. Ballard (teacher, Originator, and for thirty-three years, President of the AA; librarian Berkshire Athenæum since 1888; member of various literary and scientific societies; author of "Three Kingdoms" and several other scientific books, "Virgil's Aeneid Translated into English Hexameters" and other literary works), Pittsfield, Massachusetts; Ex-President; Personal Adviser.

Hiram E. Deats (farmer and "Founder" of AA incorporation, 1892, by gift of $5,000; Member and Secretary of the Board of Corporators of the Peddie Institute at Hightstown, N. J.; Secretary of the Hunterdon County Historical Society, Flemington, N. J.; President American Philatelic Association) Flemington, New Jersey; Business Adviser.

Honorable Homer S. Cummings (attorney-at-law; Ex-mayor and present Corporation Counsel of Stamford, Connecticut; President Board of Trade; President Civic Federation and holder of various other prominent legal and political positions), Stamford, Connecticut; Secretary.

Walter D. Daskam (Ex-treasurer of Stamford and Treasurer and Secretary of The Stamford Trust Company), Stamford, Connecticut; Treasurer.

Dr. David Starr Jordan (President Leland Stanford Junior University; pupil of Louis Agassiz; author of "Agassiz at Penikese," and of a large number of scientific books; has had extensive experience as an educator; member of various prominent scientific societies and an active worker in the AA for many years), Leland Stanford Junior University, Palo Alto, California; Dean of AA Council.

Dr. Leland O. Howard (Chief of Bureau of Entomology of the United States Department of Agriculture; Permanent Secretary American Association for Advancement of Science; author of various scientific books and an active AA worker for many years), Washington, D. C.; Naturalist Adviser.

Reverend Charles Morris Addison (Rector St. John's Episcopal Church,



DAVID STARR JORDAN.
President Leland Stanford Junior University, California.
Dean of the AA Council.

President Jordan writes:—

"I have been acquainted with the work of The Agassiz Association from the very beginning.

"There is no kind of intellectual training more valuable than that of learning to see what lies about us and also what the different objects seen signify. Every fact has a meaning. It is part of the relation of cause and effect; and the great students of nature are those who have been able to see the fact and to look behind it to the principle or law or cause of which it is a visible result. **I regard your Association as one of the most important educational institutions of this country."**

Stamford; has strong scientific tastes; conducts a vegetable and flower garden for the instruction and with the help of the children of his Sunday School; has an AA chapter in Boys' Club and has been an active worker in the AA for many years), Stamford, Connecticut.

Dr. George Sherrill, (prominent physician; member of the AA since boyhood; has strong love of natural science and of outdoor life), Stamford, Connecticut.

Dr. Howard thus expresses the need of more observers, with the AA spirit:

"There is nothing I can tell Dr. Bigelow, and probably nothing I can tell the people whom he interests which is new in the way of argument of inducement to observe nature, but there is so much in insect life that still remains to be known, so many interesting facts which the observer, however placed can find out that will add to the sum total of human knowledge, that it is a wonder that there are not many more entomologists than there are. I have pointed this out in the introduction to 'The Insect Book,' which in fact was written not so much to tell what is known but to point out what is not known but which nevertheless can be more or less easily found out. The most unobservant of persons, sitting for example on a vine-shaded



LELAND O. HOWARD, PH. D.
Washington, D. C.
Naturalist Adviser.

veranda, needs only to concentrate his attention for a few minutes upon what is going on among the insects on or about the very vines that shade him, in order to become interested and to desire to seek for an explanation of the things he sees."

THE CHURCH AND NATURE STUDY.

BY REVEREND CHARLES MORRIS ADDISON.

The church is commissioned to teach the truth of God, to help men to obey God and to inspire them with love and reverence for God.

It may use various means to accomplish these ends. Some churches prefer to use exhortation and the prayer meeting; others think it more useful to use the sacraments and incense; others depend upon intellectual instruction. The



REVEREND CHARLES MORRIS ADDISON
Stamford, Connecticut.

best church or the best parish is the one which can consistently use the most methods. Almost all try to use as many as possible. The most progressive will have gymnasiums and baths and manual training classes, singing schools and dramatic and social clubs.

Very few as yet have added nature study. I believe in this as a most valuable adjunct. I deem it better and more Christianizing for the young people than making them sing hymns which they don't understand or give immature religious experiences in public. Nature study helps towards the development of the body in God's out of doors. Nature study helps the rounded development of the mind. God in nature has given us the best graded system of instruction which we have, adapted to the little child picking up shells upon the seashore and up to Newton studying the abstract mathematics of the stars.

Nature study impresses moral lessons of utter obedience to law and helps to watchfulness, adaptiveness and helpfulness. It enlarges the child's appreciation of and passion for beauty and gives him grounds for the love of God, for reverence and gratitude. Therefore, as twenty years ago in Fitchburg, Massachusetts, so now I welcome the work of The Agassiz Association and claim it as part of the church's work and am glad to use it as one of the ways to lead young people to God and to make them better followers of Jesus Christ who cared for the sparrow and noted the lily of the field.

LETTER FROM HARLAN H. BALLARD.

(Thirty-three years President of The Agassiz Association.)

Pittsfield, Massachusetts.
December 15, 1908.

EDWARD F. BIGELOW, PH. D.,
President The Agassiz Association.

Accept my congratulations upon the reorganization of The Agassiz Association, which you have accomplished, and upon the bright outlook for success which is opening before you.

Since you accepted the arduous and somewhat thankless task of President of the AA two years ago, I have kept in touch with your work and I know that nothing has been left undone which enthusiasm and energy could do. You have infused new life into the Association, have broadened the scope of its endeavor and have succeeded in arousing an interest in nature, and in the Association among men of influence and power. The magazine, THE GUIDE TO NATURE, has been established and maintained by you at a very high standard.



HONORABLE HOMER S. CUMMINGS
Stamford, Connecticut.
Secretary of the AA.

This has been possible only at the cost of great labor and self-sacrifice on your part.

I am particularly gratified to learn that through the beneficence of a true lover of nature and of children and a most cordial sympathizer with yourself, you are about to have the opportunity of trying a novel and most important educational experiment, on a large scale, by the establishment in a delightful locality of an adequate home or headquarters for your work.

This I understand is to be at first a place with suitable buildings, in which you and your assistants can carry on independent study and experiment, with accommodations for such students as may visit you, and for a few laboratory workers.

I understand, also, that you have in mind the possibility of such future enlargement as will tend to the realization of our long cherished dreams, of a colony or settlement of nature students, at least during the months of summer, and that there may be provided for their use all the space, material and apparatus necessary.

Permit me to add that in the course of my duty in auditing your books for the past two years, I have observed that you have had no compensation for either your own services nor (in the active work of THE GUIDE TO NATURE) for those of other members of your own family, and I understand that it is your purpose to continue this gratuitous service.

The primary interest of The Agassiz Association has always been in young people, boys and girls; our secondary, though equally genuine interest, in the advancement of science.

We have seen thousands of youths led to a deep and abiding interest in nature; and we know that they have been elevated and strengthened in character and intelligence by their own endeavor.

Very many of them have developed abilities which have secured for them positions of responsibility, influence and honor in the scientific and educational world. The membership of The Agassiz Association has proved to be a seminary or nursery of science, and from it many a promising sapling has been transplanted to a higher and more productive field.

With all good wishes,

Sincerely yours,

HARLAN H. BALLARD.

A HAPPY NEW YEAR TO ALL.

With our new organization, with the formation of several Chapters and with the prospects of "Arcadia," we indeed are happy and shall strive to make 1909 the most valuable of all in our work.

The *World* is certainly a great and stately *Volume* of natural Things; and may be not improperly styled the *Hieroglyphicks* of a better: But, alas! how very few leaves of it do we seriously turn over! This ought to be the *Subject* of the Education of our *Youth,* who, at Twenty, when they should be fit for Business, know little or nothing of it. —William Penn.

LITERARY AND BIOGRAPHICAL

Stories of Rocks and Minerals. By Harold W. Fairbanks, Ph. D., for the Grammar Grades. Boston. Educational Publishing Co.

"It is not the intention of the author to offer this little book as a systematic treatise upon minerals and rocks. Only the common ones are discussed, and in the treatment of these the effort has been not so much to impart information, as to arouse the interest of the pupil; to lead him to see in rocks and minerals and the changes which they undergo illustrations of the great processes which have shaped the earth and fitted it for habitation.

"Rocks and minerals in themselves are often attractive. Many of them are intimately bound up with our every-day experiences. This is not all; they have not existed eternally as they are now. They all have had histories which are often of exceeding interest; histories which, when understood in even the most simple way, add greatly to the intelligence and pleasure with which we can study them."

The Microscope and Its Revelations. By Carpenter. Eighth Edition. Philadelphia: P. Blakiston's Son & Company.

This volume is a veritable library in itself with its eleven hundred and eighty-one pages, five photographic plates of diatom resolutions, nine colored plates of algae, desmids, acarina, etc., nine plates in black and white and over eight hundred finely executed cuts in the text.

This well known work illustrates and describes, at considerable length, all the different classes of microscopical objects. Monographic chapters on the different species of animal and vegetable life, from the simple cell to the higher complex organisms, make this volume a valuable and pleasant "revelation."

There are clear and full descriptions of instruments, accessories, illuminators, etc., with directions for their proper use—and the "why" of it. Methods for the preservation and preparation of objects, for imbedding and cutting sections, for staining and mounting in balsam and fluid, in shallow and deep cells, are given in full detail.

This book encourages the reader to look into the microscopical world with, at least, a pocket magnifier, and a pocket lens ought to be carried and used by every reader of this journal.

The ordinary lazy amateur cannot hope to follow the studious technical man, who has forged so far ahead in his line, but the technical man is still far from knowing it all. The field is very, very wide and it cries loudly for a thousand workers to come to the harvest.

The insect world alone, with its many varieties of metamorphoses and developmental changes, presents opportunity for many workers. Insects have sense organs in the antennae and legs and perhaps elsewhere. Look for them. Gall insects and their ways are still little known. Insects parasitic on other insects need more study. Almost every species of animal and bird has its own parasitic insects and mites, of which much is still unknown. These parasites sometimes trouble man. Plant tendrils and other plant organs have lately been found to possess something like sense organs. The fertilization of plants is still imperfectly known, excepting in a relatively few species. The rusts and other microfungi have been studied by few; yet they are common at all seasons. The technical man is not numerous enough to cover all the ground and keep it for himself.

The coming amateur must, however, go a little deeper than the old time, easy going preparer of dry wings and legs. He must do better and he can do better work.

Imbedding insects and developing plant buds, cutting them into serial sections and using the standard nuclear stains is, at first, troublesome but not at all beyond the ability of the average handy man. The series of operations soon becomes, in a measure, automatic, and as experience ripens the difficulties become lighter and a routine series of steps is soon established. Having mastered the technic of making sections of objects containing loose or delicate internal parts, the world seems ready to surrender her secrets. The study of serial sections is extremely fascinating; the wonderful cell structures and cell relations continually incite one to go deeper into the subject. The amateur thinks he is barred out by natural selection; he is barred only by an unnatural dejection. The micro-worker can find beautiful and wonderful things in his garden. He is not limited to daylight nor to flashlight. He can do valuable work during his evening or other spare hours, if his days are occupied with the sterner duties of life. All the steps of preparing, cutting and staining have "lie over" periods which can be arranged to permit the personal attention to come at convenient times.

S. G. SHANKS.

THE GUIDE to NATURE

STAMFORD, CONN.

EDWARD F. BIGELOW, Editor

Vol. 1 FEBRUARY, 1909 No. 11

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PUBLISHER'S NOTICES

The Guide to Nature.

EDUCATION AND RECREATION

AN ILLUSTRATED MONTHLY MAGAZINE FOR ADULTS. DEVOTED TO COMMONPLACE NATURE WITH UNCOMMON INTEREST.

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Vol. I FEBRUARY, 1909 No. 11

SILKWORM DEVELOPMENT.

To nature study workers wishing to obtain silkworm specimens or an exhibit illustrative of the silkworm of commerce in its different stages of development from the egg to the moth, including products and food plant, information on the subject may be had by communicating with T. A. Keleher, P. O. Box No. 82, Washington, D. C. I have before me one of Mr. Keleher's silkworm exhibits and can say it is ideally arranged and a very useful object lesson for the use of teachers.

AS AN INDIAN COMMISSIONER.

I take pleasure in informing friends that on the 10th of December President Roosevelt appointed me a member of the United States Board of Indian Commissioners. This does not interfere with my duties at Andover Academy, as I shall work among Indians during vacations—chiefly in the summer.

The Board passes upon affairs of the United States Indian Department and has general control over the supplies issued Indians, their education, discusses questions of land ownership and other matters of consequence.

The position enables me to accomplish much towards extending the blanket and basket industries and will, I trust, prove of benefit to me in my studies. The Board seeks to better the condition of Indians and to advance their prosperity.

WARREN K. MOOREHEAD,
Andover, Mass.

JUST THE THING TO SAVE THE PLANTS.

Any one desiring to procure an excellent hand plant sprayer to spray the leaves upon indoor plants, to keep the insects off and otherwise keep them



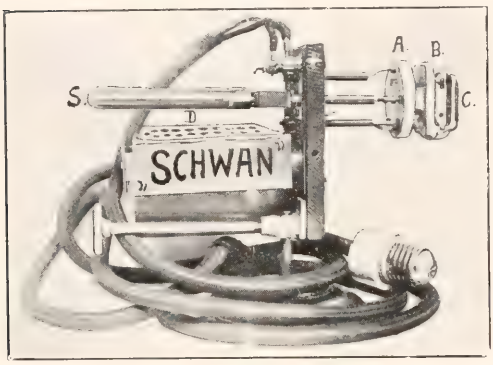
healthful, should send $1.00 to The G. N. Lenox Sprayer Company, 165 West Twenty-third Street, New York City, and receive one by return mail. This

sprayer will spray under and over the leaves. Three cakes of tobacco soap to make a spray solution will be included.

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Curator of the Department of American Archæology, Phillips Academy.

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W. K. MOOREHEAD,
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Nature and Science FOR YOUNG FOLKS

(A Department of
The St. Nicholas Magazine
PUBLISHED BY
THE CENTURY COMPANY
New York City)
Edited by
EDWARD F. BIGELOW

The publishers in their announcements for 1909 refer to Nature and Science as "that delightful and helpful department" and state that it "promises more interest and profit than ever."

"Nature and Science has won its present high standing by accuracy in portraying nature from the standpoint of the child. The editor has secured the co-operation of nearly all the best naturalists, scientists and nature artists in the country. The text and illustrations are directly from nature—not from books—and are absolutely true. So carefully is every statement weighed, questioned, and criticized, that every parent, every teacher, every child has implicit confidence that a statement in Nature and Science can be absolutely relied on. And it's interesting."

PERSONAL.

I desire to continue and increase this co-operation. Photographs, contributions, drawings and suggestions are cordially solicited. Those accepted will be paid for. Descriptive circular of Nature and Science upon application. Correspondence invited.

EDWARD F. BIGELOW.
Stamford, Connecticut.

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Washington, D. C.



A PHOTOGRAPHIC STUDY OF ICE PILLAR AND ICICLES.

By George W. Kellogg, Rochester, N. Y.

There are men who have never known any friendship in Nature; others again who never outgrow the love of birds and flowers, who preserve some youthfulness and innocence which keeps them in touch with wild life. Over and above a healthy curiosity, or any scientific acquaintance, it is the companionship of the woods and fields which counts—a real friendship for birds and bees and flowers. Let us remember the woods in the days of our youth, that we may have this unfailing resource in later years.—"*In the Open*," *by Stanton Davis Kirkham.*

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I **FEBRUARY, 1909** **No. 11**



Up-to-Date Dahlias and Their Culture.

BY MAURICE FULD, BOSTON, MASS.

THE phenomenal popularity that this grand garden flower is enjoying at the present time is due mostly to the introduction of newer forms and colors which appeal to all flower lovers.

The interest taken in this flower has exceeded that of any other garden species, and justly so, for where can we find another kind that can be grown with such wonderful ease and little care, and produce fantastic blooms of immense proportions and in such a great abundance that you can give away thousands of them a day and still have your garden full of bloom.

Exhibitions which have dahlias as their sole attraction are now a common occurrence and it is a pleasure to the horticulturist to note the extreme interest the amateur gardener takes in this flower, how intensely he studies the names of varieties to familiarize himself with this wonderful large family.

The real lover of dahlias is one who is not satisfied unless he grows from three to five hundred sorts in his garden and he can show you around on a bright fall day and name you off this wonderful collection, each one by its given name.

Dahlia gardens are a specialty by themselves and should be built on original and distinct lines. To connect or to grow dahlias in combination with other flowers not only distracts from the actual beauty of the dahlia but it does not add the least grace to a group of plants. The ideal spot for the Dahlia Garden can easily be found.

You are not restricted to conditions of soil, direction of sunlight or conditions of weather. The illustration which accompanies this article

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will give a fair idea what a wonderful showing can be made in an ordinary back yard and if I can awake sufficient interest in the proprietor of a deserted back yard to transform it into a paradise of bloom I am willing to write an article on dahlias every day.

The proprietor of the garden which is illustrated was the recipient of an award by the Improvement Society of his city. No other plants but dahlias were used in the decoration of this place and the showing made during September and October was gorgeous to say the least.

During any time of the year the place looked neat and clean and with his example he will have instilled sufficient love for this flower that deserted back yards in his neighborhood will be few to be seen.

In the culture of dahlias the first important step to make is to select a spot for growing them. The poorer the soil and the lighter, the better they will grow. Dahlias will grow as well in a sunny position as in a shady, with one difference. In a bright sunny spot they will grow more dwarf, flower earlier and more profuse. In a shady place they will grow tall and flower late and the flowers will be fewer.

With the spot selected it is now essential to have the land carefully cultivated and turned over. If this can be done in the fall previous, it is advisable but if only done in the spring, no manure of any kind should be added to the soil.

Rich or manured soil has a tendency to produce a most luxuriant foliage but hardly any flowers at all, therefore if the soil on the place is rather rich, I would advise dressing same with a heavy layer of fine coal ashes and have same carefully spaded into the surface.

The dahlias themselves should not be planted before May 15th, no matter how far south the garden may be situated and even by planting as late as the first of July splendid results can be obtained.

During the last season my own experience has been with dahlias that those planted July 10th produced a finer plant and a greater quantity of blooms than those set in the ground May 5th.

For the ordinary garden where space is limited 2 feet of room between the plants is all that is required. A better appearance can be made with 3 feet of room. It is here necessary to give a little explanation in regard to what to plant, either a field-grown root, a pot root or a young plant. As a rule field roots are the ones which are carried over. The clump which had formed the year previous should be carefully split into as many parts as there are sprouts, provided the spout is not detached from the tuber.

Sometimes it is impossible to separate every sprout and in such a case it is well to remove with a knife all sprouts but one. The essential point is that never should there be more than one distinct main stem growing.

Pot roots are roots grown from slips during the previous season and my experience personally has been that these roots are every particle as good as field roots. They are nicer to handle perhaps and easier to plant. No matter how small the root, if a sprout has formed the size of root has absolutely nothing to do with the future progress of the plant.

The old root which is planted is of no account. As soon as it is placed in the ground it decays and the new roots form right above it.

It does not feed the plant as a great many growers believe. Last season while I experienced an extreme drouth, the growth of the plants proved exclusively the above statement.

Until the little fibre roots could form and grow, the plants stood still without moving one inch, which showed that the large roots which were placed in the ground could not feed the new growth made before the drouth set in. Green plants which are often obtainable only, particularly with newer varieties where the quantity is limited are desirable but should be given a careful treatment.

Most dahlia growers object to green plants, for the reason that they are subject to destruction by the cutworm, and if this is once done the plant is



IDEAL METHOD OF PLANTING DAHLIAS.

It is best to have stakes and bracing supports all in readiness at the time of putting the bulbs into the ground.

lost for good but the cut-worm is an insect now-adays which can be readily fought and kept off.

A paper collar six inches in depth placed around the plant so it will extend fully two inches above the ground will prevent any cut worm attacking it. The one beautiful feature of the green plant is that it produces the finest specimen of blooms and if you wish flowers for the exhibition table green plants are the only thing to grow.

If you have to purchase your bulbs it is very essential to treat the roots immediately upon arrival. Unpack the shipment and if possible plant each tuber in a pot and plunge in a cold frame, and water them so the sprouts will develop and grow on.

If a cold frame is not handy, a cool place in the cellar or anywhere in the house will do. Light is essential. Many bulbs which are not looked after, received early in the season, will be worthless by the time of planting.

If the growth of these new bulbs is making rapid progress do not pinch back but simply retard it by placing the plants in a cool spot. Dahlia tubers when placed in the ground should be laid horizontally about three inches below the surface and carefully covered up. A stake should be placed nearby and the label carrying the name of the variety should be attached to this stake.

There is nothing to do now except keep out weeds until the plants make their appearance. From the moment they show above ground they should be well watered at least two times a week.



DAHLIA SEEDLINGS.
Showing eight weeks' growth from the seed.

Also the ground near them should be stirred up at least once a day. The stirring up of the soil is worth more to dahlias than tons of fertilizer or manure. The feeding roots of a dahlia are very near the surface and to give them an opportunity to breathe in the fresh air it is one of the greatest benefits to the plants.

If there is more than one shoot appearing above the ground, from one root, the weaker shoot should be cut down below the surface. As soon as the plant attains the height of one foot its tender stalk should be carefully but loosely tied to the stake. When the plant attains the height of two feet, it is time to give it food. This should be in the form of rotted stable manure, placed in a circle around the plant to the depth of fully four inches.

It creates a double benefit. It keeps the surface cool and moist and feeds the newly formed roots.

From now on the plant makes rapid progress and begins to branch. Now a word in regard to the shaping of the plant.

If a dwarf, bushy growth is desired it is now time to prune. This is done very simply by pinching the crown of the plant back fully two inches. The result will be that branches will break from every joint of leaf and soon you will have a very bushy and dwarf growth. For general use this is not recommended but allow the plant to grow its natural way, but when the branches appear in such quantity as to completely cover every available space of light it is essential to cut out sufficient to allow sunlight to strike through the plant at all times.

Whenever you prune, prune back to the very joint. If you intend to grow flowers for exhibition use, the pruning is very distinct.

When the plant has attained a height of eighteen inches pinch back the crown as directed before and when new branches appear watch them carefully and do not allow any subsequent branches to grow larger than to enable you to cut them out. The branch appearing from the main stem should produce nothing more than one set of leaves at each joint and at the very end one or two flowers at the most.

The feeding of the plants should be begun immediately when the crown is pinched, and just as soon as the buds form the manure, which has been placed on the ground previously, should be removed and an application of nitrate of soda dissolved in the following proportion: one oz. to five gallons of water should be applied to the plant in a circle measuring fully



A TYPICAL CLUMP OF BULBS OF FIELD GROWN DAHLIAS.



CACTUS DAHLIA "COMET."

twelve inches away from the stem of the plant. This application should be repeated every three days.

The first specimen flower appearing on this plant will be the largest that can ever be produced. During the progress of plants there are a few insects which attack it and no matter what they are the following preparation will destroy and keep them off: a weak solution of Paris green dissolved in cool water. Apply it with a fine syringe or whisk-broom to the foliage and buds of the plants after sun-down in the evening.

It is highly important that the plants are never watered during the sunny hours. Wherever the conditions are such that wind is a great factor to contend with the tying of the plants should receive a great deal of attention. In order to make them as secure as possible I advise having cross bars connect a line of stakes as many as desired and tie the branches to these cross bars. By doing this no wind can uproot a plant.

The dahlias will not produce the best specimen until August, and if buds should appear previous to that time, it is not advisable to allow them to open. Many varieties have a tendency to produce imperfect flowers in the beginning, and if this is noticeable all succeeding buds should be removed for at least a week or two so as to enable the plants to gain sufficient strength to produce perfect blossoms.

Where a dahlia garden takes up but a limited space the flowering season can be prolonged way into November but while I admit that early frost often appearing as early as September will kill enough of the plant to stop them from further blooming this can easily be prevented by building a provisional tent over this garden. Drive your stakes to fully two feet above the highest plant and use in covering such as muslin or a light canvas but have this cover come right down to the ground.

Once this first frost is away we usually have splendid flowering weather until almost Thanksgiving. The dahlia thrives especially well in locations near the seashore, for it receives the moist, cool nights which seems to be its greatest stimulant.

A word about cutting flowers and keeping them. Flowers are best cut extremely early in the morning, while the dew is still on them and placed immediately in cool water and kept in a cool place for at least two hours. Such dahlias will easily keep from



PECULIAR TWISTS OF PETALS OF CACTUS DAHLIA "LOYALTY."



PEONY FLOWERED DAHLIA "DUKE HENRY."

two to three days in perfect condition but if you should wish to send dahlia flowers to your friends at quite some distance away and they should arrive in wilted condition advise them to place the stems of the flowers immediately into boiling hot water and they will quickly revive and be just as fresh as they appeared the time they left you.

The taking up of the dahlia roots should not take place until severe frost has killed every particle of foliage right to the ground. When this occurs one or two days should be given for the sap of the plant to return to the bulb.

Then the stalks of the plant should be cut back to within six inches of the ground. The roots should be carefully lifted as they often take up a space of fully two feet and more. A fork is best used and the ground should be loosened before you try to lift the roots. The lifting of the roots should take place only on a bright sunny day and during the sunny hours when the temperature is highest. After the roots are lifted they are placed up side down on the ground until the soil around them seems to be dry.

Do not shake any soil off the roots but allow any part of it to remain around the bulb. Then before sundown place all your roots in a cool dry cellar, spread them out and let them dry thoroughly.

When this has been accomplished which usually takes from a week to ten days they can either be placed in boxes or left on the floor provided this is dry and covered up with newspapers. One condition is essential and that is the temperature should not fall below forty and not rise above 50°.

It may be necessary from time to time to look at the roots and see that no decaying takes place. If any parts show that they are decaying they should be immediately removed and the freshly cut parts should be well coated with air-slaked lime. If on the other hand the roots begin to dry it will not do any harm, in fact it will benefit them considerable by sprinkling the newspaper above them thoroughly with water, also to sprinkle the floor upon which they are lying.

Towards March first the roots should be carefully moistened so as to produce the eyes to start. The separating of the bulbs could take place April 15th when they may be treated the same



SINGLE DAHLIAS.
The first type in existence.



No. 1. Show Dahlia "W. W. Rawson."
No. 2. Show Dahlia "Governor Guild."
No. 3. Show Dahlia "Mrs. Gordon Abbott."
No. 4. Decorative Dahlia "Mrs. Stuyvesant Fish."
No. 5. Decorative Dahlia "Fireburst."

as directions given for newly received bulbs. So much for the culture.

A selection of varieties to grow should be carefully studied and herein lies a great deal of the success of a garden.

It is the pleasure of awaiting each new day with a hope to see a new flower open and see the result of the whole year's work. There is nothing in the universe that can duplicate the joy when one discovers a new meritorious sort. The only thing that has so far lacked in the dahlia which other flowers possess is fragrance, but we are not far from the time when we have added fragrance to the dahlia.

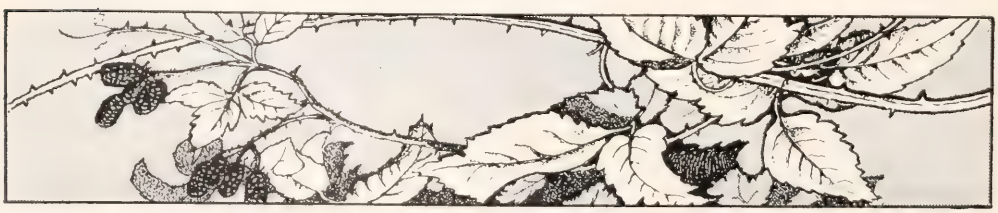
From Mexico the announcement was made last year that a new species has been found which has the fragrance of honey and even in America we see the first dahlia offered now of which fragrance is claimed. The variety in question is named "Fragrance" and is a pure white single dahlia. The writer of this article had ample proof of the fragrance which was very pleasant, distinctly resembling that of a honeysuckle.

In order to make the dahlia culture real interesting everyone should keep a record of what the varieties do every year from time to time because I have never known that the same variety will act alike each year. To re-read these notes during the dull winter months is like going over the pleasure of gardening again and will refresh memories.



READY FOR ADMIRING FRIENDS.

"There is nothing in the universe that can duplicate the joy when one discovers a new meritorious sort."



POPULAR ASTRONOMY

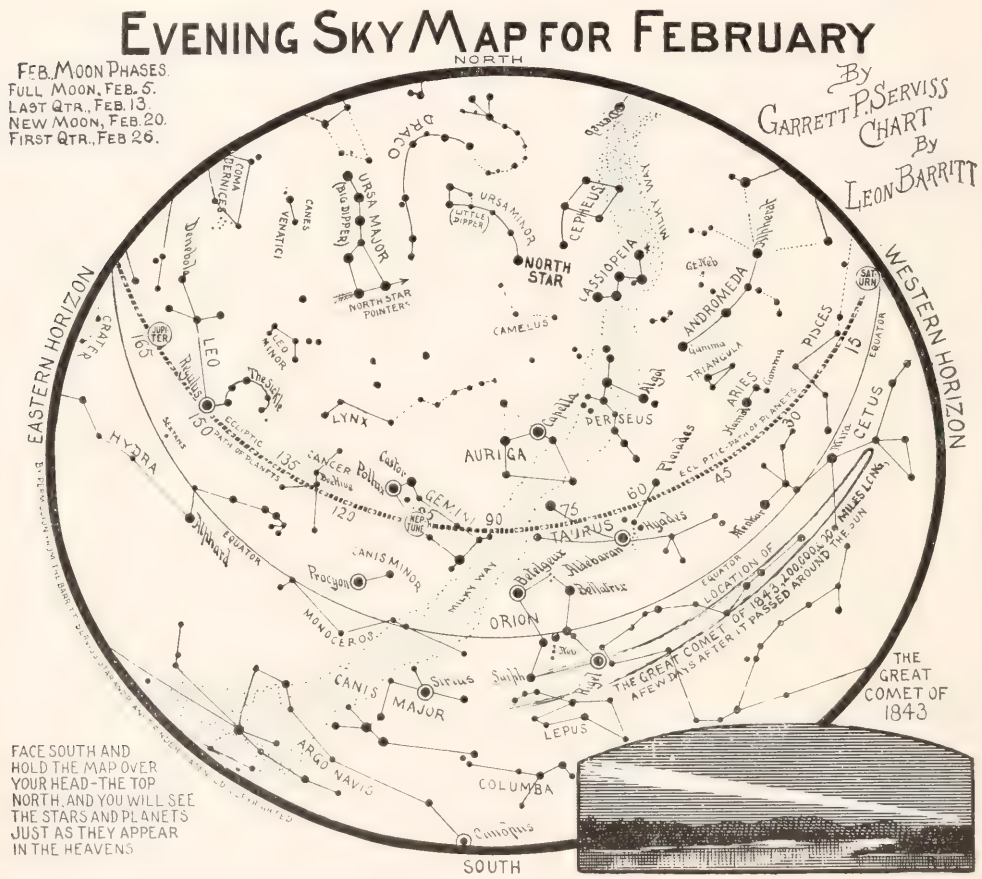
THE HEAVENS IN FEBRUARY.

BY GARRETT P. SERVISS, BROOKLYN, N. Y.

Since the most talked about subject in astronomy, this year as well as next, will be comets, on account of the return of the great Comet of Halley, we have decided, each month, to indicate on the chart the place of some remarkable comet of the past, which either reached its point of nearest approach, or presented itself under remarkable conditions during that particular month. For this month we present a drawing from a contemporary picture, a representation of the immense comet of 1843, which will be seen in the lower right-hand corner of the chart. This comet passed round the sun on February 27, 1843, almost striking the sun's globe, an occurrence nearly unparalleled, and of extraordinary interest. From the time the comet disappeared on one side of the sun until it reappeared upon the other was just two hours, during which it traveled at the rate of one million two hundred and sixty thousand miles an hour, 360 miles per second! On the chart itself will be found an outline of the stupendous tail of this comet as it was seen shortly after it had gone round the sun, when its actual length was estimated to be not less than 200,000,000 miles. At that time, as the chart shows, the head was near the star Zeta in Cetus, while the great tail stretched away to a point midway between Rigel and Sirius, a distance of about 65 degrees. The comet made its appearance very suddenly, and its enormous tail seems to have been shot forth in about twenty days from its first beginning. It moved so straight toward the sun that a very slight change of direction would have sufficed to precipitate it upon that body. In fact, it must have passed through the solar corona, that great gaseous extension which surrounds the sun and extends to a height of hundreds of thousands of miles above its surface. This great comet is interesting on another account. Recently Prof. George Forbes, of England, has shown that, taken in connection with the comets of 1882, 1880 and 1556, it gives a probable clue to the existence of another planet belonging to the solar system, but situated far beyond the orbit of Neptune. The theory of Prof. Forbes is that the comet of 1556 was disrupted into three parts by approaching very close to this mysterious planet, and that the comets of 1843, 1880 and 1882, were the remains of the original comet. By means of the tracks pursued by these comets he has calculated the position of the new planet, which he believes circles around the sun at a mean distance one hundred times that of the earth, or about 9,000,000,000 miles. Its period of revolution is put at one thousand years. Search for this planet will be made, and it is possible that photography may disclose it at any time. If it is found, in accordance with Prof. Forbes's indications, the result will be one of the most wonderful discoveries ever made, more wonderful even than that of Neptune, which was found through the influence of its attraction upon the planet Uranus. In this case the discovery will be due to the effects of the unknown planet's attraction on a comet thousands of millions of miles away. The comet of 1556 also made its appearance in the month of February, and, like those of 1843, 1880 and 1882, went astonishingly close to the sun. Its appearance was

so fearful that it has been alleged that it was the immediate cause of the abdication of the Emperor Charles V. It may be added that Prof. Forbes's theoretical discovery of a planet beyond Neptune was anticipated many years ago, and that then, too, the assertion of its existence was based upon the behavior of this same curious family of comets.

be conspicuous in the Eastern part of the constellation Leo. He rises about 8 P. M. at the beginning of the month, and crosses the meridian about 2 A. M. He is always a splendid telescopic object, and his colored belts and rapidly moving moons are sources of unending enjoyment for the observer. Being 1300 times larger than the earth, Jupiter is an imposing object even to



This month Mercury is an evening star, setting very early. The reader who possesses a Planet Finder may locate it on the chart by placing the disk representing it at the 329 degree mark on February 5. Saturn is also an evening star, setting early, but to indicate its position it is shown on the western horizon in the chart, although it sets too early for the hours that the chart represents. Jupiter continues throughout the month to

the naked eye. If he were as near to us as the moon his immense globe would fill half the sky, and the little earth would become one of his satellites. Neptune, only visible in the most powerful telescopes, is an evening star, in Gemini, crossing the meridian about 10 o'clock at the beginning of the month and 8 o'clock at the end. Venus, Mars, and Uranus are all morning stars.

STARS AND CONSTELLATIONS.

Orion, Canis Major, with the magnificent Sirius Taurus, with the Pleiades and Hyades, Auriga made beautiful by Capella, Gemini, with its twins, and Canis Minor with Procyon occupy the center of the February evening sky, and the heavens do not elsewhere contain a celestial spectacle that can be compared with that which they present. At this time of the year the second brightest star in the sky, Canopus in Argo is visible just above the Southern horizon for observers not farther North than Charleston, S. C. Canopus is a star of extraordinary brilliance and while its magnitude to our eyes is less than that of Sirius its real magnitude is known to be immensely greater. In truth there is reason to think that Canopus may have no superior in the whole universe. The best estimates indicate that it exceeds the sun not less than 10,000 times in actual brightness. Its enormous distance alone causes it to shine for us less brightly than Sirius. Among objects of special interest, which may be seen with the naked eye and may be viewed with considerable satisfaction with the aid of an opera or field glass, are the Beehive Cluster in Cancer, the Great Nebula in the Sword of Orion, and in the very wonderful nebula in the constellation. Anromeda. The first of these objects looks to the naked eye like a bit of star-spangled cobweb floating in the sky. An opera glass shows readily its component stars. The first sight of these stars by Galileo filled him with delight and amazement. It was one of the first conquests of his telescope. The great Orion nebula is faint to the naked eye, but a good opera glass shows what it is, and a telescope makes it a wonder indeed. Its outlying portions appear to involve the whole constellation of Orion. The Andromeda nebula is just visible to the naked eye but quite plain with an opera glass. The photographs now taken of this object are indescribable. They show it composed of vast whirls of light, with apparently imbedded masses of denser matter. A great creation seems to be going on there. Two very puzzling facts are known about this nebula. In the first place its distance is so enormous that no measures have been made of it. It seems to lie outside the boundary of the visible system of stars, so that some have supposed that it may be another universe than ours, just visible as a luminous speck in the abyss of space. The other singular fact, which has an important bearing on what has just been said, is that, unlike the Orion nebula, the Andromeda nebula is apparently not gaseous in its constitution. As far as its spectrum indicates it is composed of solid constituents, or of something in a semi-solid state, like liquid or gas under high compression. This would indicate that it consists of stars, which are so remote that no telescope can reveal them individually. Its vast whirls would then seem to be aggregations of stars like those that compose the Milky Way. If this be, then, another universe external to ours it would seem to be constructed on a similar plan. Andromeda sets in the Northwest rather early at this season and the observer should look for it as soon after sundown as the darkness becomes great enough. The position of the nebula may readily be found by remembering that it is Northeast of the bright star in the center of the row of three stars beginning with the Northwestern corner of the Square of Pegasus. Two little stars above the one mentioned, which is Beta or Mirach, point the way to the nebula.

The wonderful variable Algol in Perseus will be at a minimum on Feb. 12 at 7 o'clock P. M. Observers who have a telescope of not less than three inches aperture should not fail to look at the companion of Rigel, which, by its deep blue color and its relatively minute size forms a most charming object. Morehouse's comet, which is passing into the Southern hemisphere, continues to arouse great interest among astronomers by the strange forms assumed by its tail as well as by its extraordinary spectrum, showing the presence of unknown substances in its composition.

THE CAMERA

SNOW PICTURES OF COMMONPLACE SUBJECTS.

BY GEO. W. KELLOGG, ROCHESTER, *N. Y.*

Good snow pictures are worth the time and trouble necessary for getting them. The most commonplace of subjects, decorated with snow are often transformed into scenes of beauty, which, under the proper light conditions have pictorial possibilities. But few are the winter days, at least in New York state, that are ideal snow picture days; and when there are such days the good picture conditions are often of very brief duration.



The illustrations show portions of a foot path, leading into the river gorge, in one of the parks in Rochester, N. Y. Ordinarily, there are other views here, far more attractive and of greater interest, that now, with the snow and the lighting, are secondary. For two days preceding there had been a continuous storm—part snow, part rain, no wind. Then a lowering of the temperature at night; a creaking of the snow as footmen and vehicles passed before dawn; a cloudless sky —all giving promise of one of the ideal snow picture occasions.

Here are the operations. In the field, alone and working at sunrise. Sidelighting, long shadows across the field of view. Apparatus: Kodak, ray-filter, tripod; all being used. Stop, U. S. 16 (f 16). Exposures, 3 seconds.







AN EXCELLENT ICE PILLAR.

For an ideal study of pillar and icicles see frontispiece.

In two hours, field work discontinued; wind rising; snow decorations falling; picture possibilities vanishing; but cameras arriving.

In the dark room. A dilute developer. Working for detail without much density. The rest at convenience.

ICICLES.

BY GEO. W. KELLOGG, ROCHESTER, N. Y.

The illustrations show a soft, readily disintegrated bed of shale, which has receded beneath a hard, resistant strata of lime stone, which, like a shelf, overhangs the base of the shale exposure. From the surface drainage above, congealing and accumulating as it trickled from the limestone shelf, the icicles, some being from three to four feet in diameter, have grown until some of them reach the talus below; and between the ice columns and the rock wall there is ample space and sufficient footing for a person to walk through. The rock conditions here are the same as those at Niagara, and once concealed by the ice formations, one can imagine himself in the Cave of the Winds, or back of the Horseshoe Falls in winter.



A LUCKY SNAP SHOT.

Hours of careful posing could not have produced the naturalness.

Photograph by Charles L. Beckwith.



YELLOW PERCH (PERÇA FLAVESCENS).
Two-thirds natural size.
Photograph from life by Dr. R. W. Shufeldt.

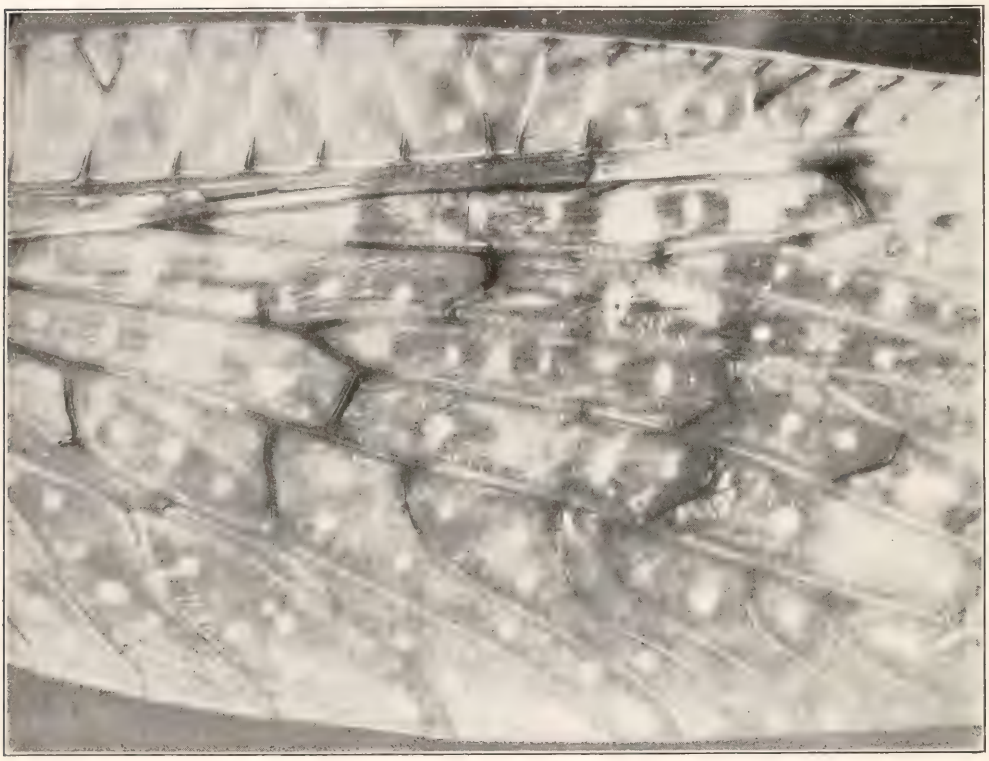


MOONLIGHT ON LAKE CHAMPLAIN.
Photograph by Miss Sarah Weaver and Mrs. E. E. Trumbull, Plattsburg, New York.

A LUDICROUS ERROR.

By a curious misconstruction of a pencil "scribbled" name on the back of an electro-type the word star-gazer read sturgeon under the cut on page 342 of the December number of "The Guide to Nature."

SEEING BY AID OF THE LENS



AN INTERESTING LENS STUDY OF WING OF CORYDALIS.

Notice the peculiar bracing in the upper part. What can be the purpose of the translucent spots?

INTERESTING FORMS OF INSECT ANTENNAE.

Between or in front of the eyes of insects are two slender, club-shaped or feathery extensions known to the scientist as antennae, or possibly as feelers. These are mainly organs of feeling but, in some insects, also bear the nerves for smelling or even for hearing, and it has been stated by Graber that in Longicorn beetles these antennae are used for balancing when the insect is walking along a slender twig, much the same as a tight rope dancer uses a balancing pole.

These antennae are of many forms well worth careful examination and study. The differences in shape and structure are often cited as one of the methods of distinguishing a moth from a butterfly, in the moth (Fig. 1) the antennae are branching and feather-



FIG. 1. MOTH ANTENNA.

FIG. 2. BUTTERFLY ANTENNA.

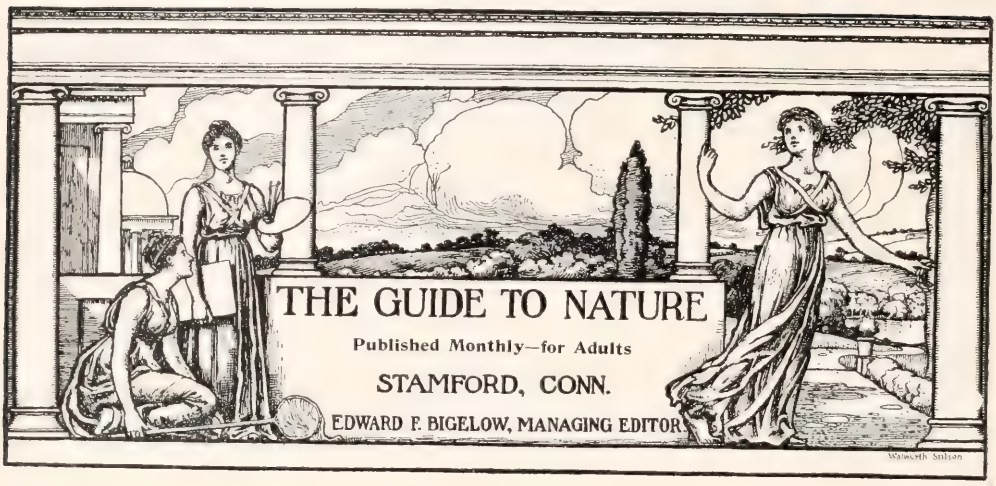
shaped; in the butterfly (Fig. 2) Indian-club shaped. It is interesting to examine these antennae under a medium power microscope, where may be clearly seen tiny pits, evidently the location of certain nerve cells. These very small pits cannot be clearly seen in a photomicrograph, which partakes more or less of the nature of a silhouette.

Experiments have been made with insects by removing the antennae. This from one point of view seems to be a cruel operation, but probably does not inflict pain in the same sense or at least not to the same degree as with higher forms of animal life. Those who have experimented along this line find that the removal is borne by different insects in different ways. Some bear the loss without much apparent discomfort as they may live for months, while others die in the course of a few days. Those that seem to be the least injured are those whose antennae have been removed in hibernation. Experiments have been made by coating the antennae with liquid paraffine, thus excluding the air, and the result upon the actions of the insect is the same as if the antennae had been removed. Probably one of the most curious and elaborately constructed of all these organs, (Fig 3) is that of the Melolontha beetle.

Under the microscope these resemble a Japanese fan. Even to the naked eye, or to the simple pocket lens, the appearance is noteworthy. With a higher magnifying power, each of these leaf-like bodies exhibits a structure which, in detail, suggests a honeycomb. Here is a good field in which a nature student may make careful study. Not only are the forms interesting, but it would be valuable to know just how these strange forms are used. One who has watched ants even casually cannot have failed to observe that at times they touch each other much after the manner of two human beings who meet and shake hands, although the results of these touchings seem to indicate that some idea has been conveyed from one insect to the other. It would be interesting, for example, to find out to what extent insects can smell with their antennae. Experiments have shown that they are useful as olfactory organs for a short distance, or perhaps, as in some cases when the male is seeking a mate, they may be a guide for at least several rods. Some experimenters claim that perhaps they may serve as guides for several miles, but it is easy to let fact merge into fancy when dealing with such natural objects.



FIG. 3. ANTENNA OF MELOLONTHA BEETLE.



THE DESECRATION OF NATURE.

To portray in beautiful art a desecration of nature or the ravages of vandals, reminds one of Dr. Holland's "Canonization of the Vicious." Think of the incongruity, the absurdity of a poem or drawing eulogistic of a stone wall bearing the Salvation Army motto, "Wash me and I shall be whiter than snow," flanked as the writer once saw it, by the insistent and clamorous command to, "Use Blank's Soap." Both announcements may be commendable in themselves but when either defaces a bit of rustic beauty it is an outrage to one's artistic perceptions as well as to one's sense of the fitness of things.

Not long ago I ordered a title page drawing of nature to be made by a skilled artist. I explained that the scene should be a ravine with a forest in the background, and that the lettering should be in a distinct and separate panel. The artist evidently thought that my artistic tastes had not been fully developed. Imagine my feelings when he brought in the completed drawing and taking it from its wrappings held it up at the proper distance with an air of pride and enthusiastically inquired, "There, how does that strike you?"

It *struck* severely hard—almost hard enough to cause collapse, surely enough to cause the artist to redraw the illustration.

In the foreground, on the bank of the ravine, he had placed a huge boulder, and thereon had painted the title in the style of an enthusiastic and enterprising manufacturer of pills!

"Oh, aren't they beautiful;" "Just lovely;" "What exquisite art;" "Did you ever see such perfect taste;" "She's an artist all right;"—these and many other similar exclamations I heard from the young ladies as I entered the room and saw them crowding around a long table on which was spread out a liberal assortment of water color drawings. The ladies were in ecstasies as they enthusiastically picked up one after another of the sketches, dropping each hastily to take another that seemed more beautiful or calling the attention of some one to a particular point of excellence.

"You like nature; come and see these drawings," was the cordial invitation. "Don't you think these are beautiful," as the young ladies made room for me at one end of the table. It must be admitted that the first glance at the beautiful cards and dainty tintings of the drawings spread in delicious disorder over the table was enough to excuse all their intensity of enthusiasm. The artist's specialty was rustic hillsides and picturesque ravines with brook, pools and foaming waterfalls. In nearly every picture was one or more clusters of white birch trees, and almost every tree had several wide bands showing where the bark had been stripped off by the vandalism that is,

alas, too common. I will not try to portray in type my disgust, my pain, at such art horror. I failed to do full justice to it orally, although I tried.

And I brought down upon my defenceless head a storm of protest, some even indignant, because I didn't "appreciate such beautiful things."

"But don't you always find it so in nature?"

"I never saw a birch tree without half the bark stripped off in just that way?"

I imagine that they were right. If they were, I pray that to such extent at least, art may not tell the truth.

I do not like the truth—no, oh, no; not that kind!

PHOTOGRAPHING THROUGH A CAT'S EYE.

That surely is a catchy title and so thought the lady who requested me to give a lecture on the subject. I had previously lectured in that town, thinking, as is always my habit, that according to the motto of THE GUIDE TO NATURE "commonplace nature" should develop "uncommon interest." And I had also hoped that where there is so much good material there might be some intelligent manifestation of interest.

But this time the request came for "something different." "Can't you tell us about a photograph through a cat's eye and such things?"

"Oh, yes; that will be easy. I can say that there is a crystalline lens in a cat's eye, a fact that almost everybody knows, and, as of course everybody also knows, that a crystalline lens will allow light to pass through it and that such an arrangement (camera-like) can transmit the light to a sensitive plate and that a photograph, even if a mighty poor one, will be the result. I can say these things and for a list of 'such things' I can call off for the rest of the evening the names of other animals, insects and birds that have eyes through which light may pass. After I have talked thus for an hour, don't you think I would do well to make it clear that such a lens is not of much help in photography; that a better result may be obtained without a lens—with a pin hole aperture or with an ordinary camera from which the lenses have been removed and the shutter stopped down to pin hole size? What is the use of using the cat's eye when even the cheapest lens of any ordinary camera will take a much better photograph?"

"No joking," she protested. "Don't you think it is really a good subject and would take?"

"Yes; it would 'take,' especially the 'such things' and any similar 'stunts' that you may have seen in the newspapers."

"But there's much in the subject itself; I know you can make it interesting."

"Yes; I would treat the subject as the clergyman treats his sermon, making it firstly, secondly, thirdly and 'to conclude.' First I would tell of the particular cat whose eye was taken. I well remember our old cat—very interesting. I found her with other kittens in the haymow and she lived with us for more than a dozen years—just the lovingest, laziest cat you ever saw and a very good rat catcher (at times). She was the ideal family cat and I could prepare a really good lecture that would be interesting to any lover of cats, telling of all her traits and ——"

"No, no. That isn't what we want—not a lecture on family cats but a scientific lecture to tell us how you photograph through——"

"Just the thing. I am intensely interested in photography. I will tell about my Zeiss and Goerz lenses; how I arrange the light and background; how it seems sacrilegious to use sunlight to make such photographic perversions and distortions as not rarely come to me or such as I see in ribbon-like films hung up to dry in certain establishments that "develop" for amateurs. The best lenses are not too good in photography and the art is worth practising well——"

But here the lady interrupted me. She said I was hopelessly incorrigible as a joker, a reputation that I have never merited. She further explained that she thought I did not understand

about catchy things to please the modern audience and to arouse their interest in novelties.

Possibly I didn't understand; perhaps she didn't ——

* * * * *

But I hope you, my lover of "commonplace nature with uncommon interest," will sympathize with the serious undercurrent that flows steadily and continuously beneath this little nonsense talk and which means that, to a true lover of nature, it is distasteful to exhibit any phase of nature as a "freak" or as a specimen suitable only for a dime museum or to degrade any aspect of nature into a scientific "stunt" in mental acrobatics to astonish the groundlings. Photography through a cat's eye has a certain interest as a scientific experiment and credit is due to those who in the right spirit have done it successfully, but my objections are to the arranging of a lot of "such things" for the special purpose of making eyes dilate and mouths fly open to exclaim, "Isn't that wonderful!"

It is wonderful; anything, everything in nature is wonderful. Even a mouse, just an ordinary, cheese nibbling mouse (not one with six legs nor with a tail a yard long!), is, as Thoreau insisted, a miracle great enough to stagger sextillions of infidels, although I think that even Thoreau was guilty of a numerical "stunt" when he made that statement. It would have been as impressive if he had put the number in comprehensible figures. If it would stagger one infidel it would stagger an unlimited number of others in a similar frame of mind. Nowadays there is plenty of the astounding in business, finance, travel, mechanics, art; and in science there is an abundance of opportunity for surprising yet truthful reports of actual occurrences. The true lover of nature seeks not the rush nor the turmoil nor the bewildering performances of semi-imaginary creatures, but the calm, restful phase—the tonic, not the temporary stimulant; the spirit of truth and of sanity, never the spirit of the sensational.

NATURE STUDY VERSUS WORRY.

The human mind does not work to its full capacity in all directions at once. It always economizes gray matter—if we may use the expression—by specializing. That which is not of immediate interest is apt to be disregarded by the mind.

There are thousands of noises which strike the ear-drum that make no perceptible effect on the consciousness. For instance, we may be in a room for hours and not notice the tick of the clock. If it stops, we notice it immediately.

There are thousands of impressions made upon the retina which leave no visible mark upon the consciousness. As I sit writing, there are in view a large number of objects which make as vivid an impression on the retina as the pencil I am using, yet they do not come into consciousness because the attention is not fixed on them.

The ability to feel is not fully developed in any one who sees. The sightless, being under the necessity of depending more upon touch sensations, develop a keenness of touch entirely foreign to those who see. No matter how much one who sees may attempt to develop the sense of touch, it is still inferior to this sense in the blind.

This great principle of the mind is one that can be utilized to banish worry. Good thoughts may be made to crowd out worry, right mental activities to supplant those that are wrong.

One who is busily engaged, giving attention to the messages that go to the brain through the eye and ear, has comparatively little time to worry. To worry is to have eyes and see not, to have ears and hear not, because the mind is centered inside, on woes, supposed or real. No man, while he has a real interest in nature, can have much time for worry.

For this reason, nature study is a sovereign cure for the blues. Let one form the habit, when walking, of seeing things, of catching the myriads of messages nature is sending inward—or as many of them as possible—and my word for it, he will have no time for worry, and once the habit of ob-

servation is fully fixed worry will be effectually banished.

This is why such an organization as the AA (The Agassiz Association) is a capital Don't Worry society. It has no "Non't Worry" by-laws, no "Don't Worry" mottoes. It says nothing about worry. It gets its members busy in the very natural and very agreeable and all-absorbing work of taking a peep at nature in some of her phases, and watching the wheels go round.

How much do you think a child worries while, with big eyes, he sits watching the wheels go round in a clock? You know he has no thought for anything else. Fill the mind with the beauties of nature, keep it full, and worry will be banished.

Worry is simply a habit. But you can not cure it by resolves. You can not cure it by calling attention to it. You will worry the more, in all probability. Sometimes we kill out weeds by planting a very strong, thrifty grass. Kill out worry by planting the habit of observation, and carefully nurture it until it has obtained a good start.—*Life and Health.*

CORRESPONDENCE AND INFORMATION

CARE OF PRIMROSES.

26 S. Clinton St., East Orange, N. J.

To The Editor:—

Will you or some of our AA friends please tell me what is the best treatment for the primrose as a house plant and also what is the best book (not too expensive) for a guide in the care of plants in the winter?

Yours truly,

Sarah Root Adams.

SOME GOOD ORIGINAL OBSERVATIONS.

473 Madison Street,
Brooklyn, New York.

To The Editor:—

I have made a special study of birds for less than two years so probably I should be wiser to wait and in time answer many of my own questions. I asked about woodpeckers bathing and drinking as I had seen scores of flickers, many sapsuckers and a good number of brown creepers and downy woodpeckers but had never seen any of them go near the water. Recently I saw a brown creeper drinking, so that partially answers my own question.

I wonder if it is unusual for a hermit thrush to spend the winter in Prospect Park, Brooklyn. I had not seen one since November 21st and supposed they were all gone. Fifteen days later, on December 6th, I was surprised to see one, and again on December 9th and 10th. On the last date it was nearly dark and I had given up hope of seeing him when he came tripping along on the thin ice till he came to an opening about a foot across, where he stopped to drink. He then passed along to the edge of the ice, stepped off into the water and took a good bath. Days passed with no sight of him and I feared for his safety, but on December 21st he appeared again looking in his usual good health, took a thorough bath, preened himself well and retired. This was about noon. At three o'clock the same day he showed himself again, coming within ten or twelve feet of me. I call this the same individual because I have seen only one at a time and each time in nearly the same spot.

Here is a little matter I have been puzzling over all the fall and winter. In this same park (Prospect Park, Brooklyn, N. Y.) is a conduit two or three feet in diameter with a very

little water constantly flowing from it. Around the outlet is an upright, rough, brick wall two or three feet each way which is weathered so it is whitish and greenish. The grey squirrels frequently come to this wall, licking the bricks most industriously, sometimes continuously for ten minutes or even more, till a spot larger than a person's hand looks bright and clean as though thoroughly washed.

On December 21st, 1908, I saw at least three English sparrows stand close to the wall, reaching up to peck from its perpendicular face, and occasionally hover before it higher up long enough to peck at it. Is it probable the vegetable growth that gathers on the wall or some chemical which is connected with the bricks which attracts them?

In September or October of 1908 I saw a water thrush wading in some shallow water in Prospect Park, Brooklyn, N. Y., and in the mud close by. A large frog came out of the water, creeping along stealthily as a cat and with the same slow motions toward the water thrush. The bird kept stepping out of the frog's way but did not seem at all afraid. After some minutes the bird flew along some feet away and very soon the frog turned, hopped back into the deeper water as though his game had fled. I suppose, however, it would be impossible for a frog to catch a bird. Still he looked as if after game.

Yours truly,
CAROLINE M. HARTWELL.

Will our readers please inform as to what the squirrels and sparrows found on the wall?

Has anyone seen a bullfrog swallow a bird?

I am willing to go with "The Guide to Nature" for a year, and I certainly wish you great success in the venture.—A. R. Spaid, A. M.



YOUNG WILD DOVES ON THE NEST.

San Antonio, Texas.

To THE EDITOR:—

The wild dove in Texas breeds several times during the summer months—up to November. Its nest is a very plain



THE WILD DOVES ON THE NEST.

and fragile affair composed of a few dry grass or mesquite helmets. The photograph shows one such nest with the young brood about ready to escape the nest.

Yours very truly,
R. MENGER, M. D.

INFORMATION.

Duluth, Minnesota.

To The Editor:—

1. Portrait Attachment:—I would like to get the trade name and address of the manufacturer of the fifty (50c) cent portrait kodak attachment.

2. Sea Urchin Spines:—Has any one mounted sections of the sea urchin spines, such as shown in the November issue of THE GUIDE TO NATURE, for sale; or, if not the ornamental mounting, can one obtain unmounted sections, prepared ready for mounting, of different species of echinus?

3. Mounting Insect Eggs:—I wish some one would tell the best way of preserving eggs of moths and butter-

flies for microscopic study. I had some beautiful specimens last summer but they turned black and shriveled up—much to my disappointment.

Yours truly,

N. B. PENDERGAST.

1. Address the Eastman Kodak Company, Rochester, N. Y., referring to THE GUIDE TO NATURE.—E. F. B.

2. Sections of sea urchin spines ought to be had from any of the large optical establishments. They were formerly among the very common objects for sale. Try the Bausch & Lomb Optical Company, Rochester, N. Y., or Williams, Brown & Earle, Philadelphia, Penn.—S. G. S.

3. Eggs of moths and butterflies should be mounted in weak formalin (5%) or in glycerine jelly. Some fertile eggs make good objects after the larvae have escaped. These may be mounted dry in a cell.—S. G. S.

ROOTING LEAVES.

Joliet, Illinois.

TO THE EDITOR:—

If nobody else answers that query about coleus leaves better, you might say that a number of leaves are known that will produce roots in moist sand and so remain alive for some time, but the majority of them appear to be unable to originate buds and to produce new plants. A few leaves, such as the *Bryophyllum* and some begonias, are able to originate buds, not only from their stems or petioles but from the edges of the leaves as well. One only needs to peg down such leaves on moist sand to get a colony of young plants.. It is interesting to note that one of our common plants with this habit is the well known sundew which may be found in almost any sphagnum bog.

Yours sincerely,

WILLARD N. CLUTE.



EXPERIENCES WITH TAME CHIPMUNKS.

BY FRANK S. MORTON, PORTLAND, MAINE.

Probably no other of the small mammals is so well known as the chipmunk. He likes the edges of the wood and the stone walls for his home and seems to like the company of human neighbors. By his cheery and lively ways he finds a warm place in the hearts of all animal lovers. His peculiar chipping sound is known to all. He ranges all over the United States, although he varies some in different parts of the country. He differs from the other native squirrels in having the cheek pouches in which he carries his food. He is continually at work filling these pouches with food and carrying them back to his burrow for winter use.

I have kept specimens of the chipmunk in captivity for nearly three years. One specimen I have is over three years old and is as healthy and contented as any wild creature I have ever seen. They never get as tame as the grey or flying squirrel but are —if my specimen can be taken as an example—better able to adapt themselves to captivity than either of these, not being subject to so many diseases as the grey and being less timid than the flying squirrel.

The one great absorbing point in the life of the chipmunk is the hunt for food. In captivity this mania for storing things away is just as strong as in the wild state. They live on nuts and grain and are very fond of fruit and berries. They possess a great degree of intelligence in their hunt for food but are limited beyond that. Every-



I WONDER WHETHER THE CHIPMUNKS REGARDED THE HAND AS THEIR PET?—E. F. B.

thing revolves on this search for food and by appealing to their greed they may be made to perform very cunningly, and will learn to know their



EXPLORING THE "TAMED" HAND.

friends so that they will not bite and can be handled and petted safely. A stranger will generally be met with the same reception however that he would get in the woods. They are great fighters and the point of attack is generally the ear. A specimen with whole ears is generally the exception.

A noticeable characteristic also is their method of hiding when alarmed. Their first act is to crouch down perfectly still until they get their bearings and then rush away with a loud noise as if they challenged anyone to follow them. But they go only just around the corner of the nearest object where they lie perfectly still until they find another move has to be made. If you don't find them they slyly sneak off until they are out of reach. Their curiosity soon gets the better of them, however, and they are out again very soon.

The chipmunk's hole is generally near some tree or stump and is a long gallery under ground with a storage chamber for food and a winter lodging. What becomes of the dirt when he digs his hole is the great puzzle among naturalists and many theories have been advanced. John Burroughs in his book on squirrels says it is evident that he carries away the loose soil. Dr. C. C. Abbott published in 1875 a book on nature observations in which he devotes many pages to the subject. In my opinion, judging from my observations of captive specimens, the side as he progressed. The very latest works however still consider the matter as unsolved and in Stone and Cram's work on American Animals it is stated that the authors believe it to be a common practice for the chipmunk to carry out the earth in its cheek pouches, and dump it at some distance from the hole. In May, 1907, Mr. Ernest Seton Thompson published an exhaustive article on the animal, and he states that he is in ignorance as to just how the hole is dug. He says, "I am not aware that anyone has watched a chipmunk actually at work



GETTING WELL ACQUAINTED.

Dr. Abbott came very near a solution of the matter when he claimed that the creature did not take out any earth but pressed it in some manner against burrowing," and states that all knowledge so far has been obtained from circumstantial evidence.

I think I am able to carry observa-



"I LOOK BEST IN PROFILE" IF YOU PLEASE.

tions a little farther than any yet published as I was fortunate enough to tame a female specimen sufficiently to make her attempt at least to dig a hole in my presence. This came about by accident in the effort to make the animal as comfortable as possible in captivity and in thus doing a large jardiniere of damp earth was furnished her in which to dig. As I imagined it would be, the earth was a great source of comfort and immediately on being placed in it she would begin to dig. She made the earth fly so that I one day placed my hands at the side of the jar so that the earth would not fly over the room. She began packing the earth against my hands and was soon half way to the bottom of the jar. It was then that I observed that after digging away the dirt with her fore feet like any burrowing animal, and throwing it under her body, she whirled around and began tamping and packing it away with her head, using it as a battering ram and packing in the earth at each side and when possible at the top. To further try her I placed my hands down over the pile of earth so that they formed sort of an outer covering to tunnels she was digging, and she continued packing the earth against my hands so that it formed a complete and solid tunnel, my hands holding it in place. She used her mouth to pick out pebbles. A fern had been formerly growing in the jardiniere and there were several roots which she also tore out with her teeth. But not a morsel of earth did she take in her cheek pouches, but on the contrary was continually stopping and cleaning her mouth and fur. She became utterly absorbed in the work, so much so that I could hold her by the hind parts while she dug with the fore feet! [Good, good, good!—E. F. B.]

I have found no animal which follows out in captivity any more exactly their wild ways than the chipmunk. Fill his food dish with nuts and he does not rest until it is all transferred to his nest. Therefore I believe that this female worked exactly as she would have done in digging her burrow. My theory is that the hole is dug near trees or stumps where the earth is comparatively soft and spongy and that it is packed away in the manner above described. It is true that holes are often found in hard places by the roadside—I found one this fall fairly into the hard part of a country road—but this is only one entrance and in such cases I believe loose places under the road are taken advantage of, and that it is the hole that winds up the digging (all burrows have two entrances) and not the one where the burrow is started.

[What an astonishing and pleasurable experience with that digging chipmunk! How we envy Mr. Morton in that experience. A day in which such an event occurred was really worth living.—Ed.]

"IKEY," A REMARKABLE PARROT.

BY A. LOUISE ANDREA, NEW YORK CITY.

As near as we can tell, this parrot was sixty-five years old, for he was a family possession during forty years and came to us without any character and reputed to be twenty-five. He was uncannily clever and had such a distinct individuality that he led us to think that there must be something in either the doctrine of metempsychosis or obsession.

Perhaps his gifts received extra development through long residence in a college town, for the minister said he possessed sophomoric omnisience. Also the parrot knew his rights and insisted upon their strict observance.

He had been named Ikey in consequence of the shape of his nose and he not only took to the name readily but always spoke of himself as "Ikey." He was a large green bird, with red markings and his active little brain had stored away an astonishing wealth of information, knowledge and experience.

Most assuredly Ikey could be called a talker and not in the ordinary "parrot" sense—that is, using words and sentences that sometimes fitted occasion. No, for daily he used language that proved he knew just what he was saying and why he said it. Nor was it all mere repetition, for very often he came out with utterances that must

have been original with him. Furthermore, besides his conversational gifts he could sing and employed his extensive repertoire with unctuous relish —no matter what the neighbors thought.

The bird was considered a member of the family, practically on a par with the rest and being much talked to—and, incidentally, much spoiled, was probably helped into original lines of reasoning. His only punishment was to have a large cloth thrown over his head in the daytime. This he loathed with all his parrot heart for he was so afraid he might miss something as he was exquisitely curious and always wanted to know what was going on. When covered as a punishment, he would scold and grumble at first, and from his language, there was no mistaking his displeasure. He had his ideas of us and they were far from flattering, at the same time curiously well confined to speech more or less permissible. After a while a subdued voice would issue from under the cloth, "Ikey be good." "Ikey be good now." As the cloth was generally administered as a corrective of his noise, he would be asked if he would be quiet? This he readily promised, but he was unreliable and his most solemn promises were utterly worthless. The cloth being removed he would sit quietly until he had been forgotten, then emit a rapid succession of screeches so hideous that they would make one's blood run cold.

Very frequently his remarks were so apt—so maliciously well timed, that it was difficult to believe that he had not been taught his disconcerting speeches. For instance, a young lady staying with us had been receiving some attention from Captain S—. One day when the gentleman called, Ikey had been liberated and was in the kitchen, assiduously "jollying" the cook. Suddenly the bird entered the parlor, deliberately waddled up to Edith, planted himself squarely in front of her and asked, "How's the Captain?" Nothing could ever make Edith believe that some one of us had not taught Ikey this question, but I am just as sure that none of us did. In any event though, the opportunity for deliverance was entirely of Ikey's own selection.

Ikey dearly loved to start a dog fight and one afternoon was a red letter occasion for him in this respect. A neighbor happened to be on her doorstep, watched the whole process and reported the affair to us. Ikey was in the open window when two dogs met in the street. The animals circled round each other in the stiff hostile manner which strange dogs display under such circumstances. Most probably they would have gone about their respective businesses in peace had it not been for the parrot. Nothing escaped Ikey's attention, indoors or out and he joyfully seized this chance for creating trouble. *"Sic 'em,"* he yelled, and his *sic* began with a long, artistic hiss. At the first call the dogs looked up in surprise. At the next *"sic 'em,"* the brutes concluded that the superior mentality of some human being was urging them on. So they promptly joined in frenzied battle while high above their noise floated Ikey's piercing encouragement. Other dogs hurried up to investigate and participate until the roadway was full of dogs snarling, snapping and waging delightful conflict.

Attracted by the din, the housemaid ran to the window, then hearing Ikey's joyous yells at the fighting animals she popped the cloth over his cage, utterly extinguishing the bird's delight. That time though, Ikey did not scold but for two hours after there came from the gloom of his cage the most ecstatic chuckles. Verily fond memories were working!

Towards dusk, Ikey always wanted his cover put on for the night; the day's activities had doubtless tired him. If neglected in this regard he would make his wants known. His call would float through the house, in sweetest flutelike tones,—"Mother! Mother!" Mother would respond and the parrot would murmur drowsily—"Poor Ikey. Ikey's so sleepy." Then he would be hushed until next morning, absorbing energy for another day of activity, eloquence and crime.

Ikey's greatest horror was his bath. This ceremony was performed by placing his cage on the ground in the backyard and pouring water over him with a sprinkling can. He would sit on the bottom of his cage, huddled up as small as possible so as to escape any drop of the detestable liquid. If anyone appeared in the basement doorway, Ikey would rise up with a hopeful air. At last a friend had appeared who might prove a friend in need! "Bring a 'brella," he would screech. "Bring a 'brella, quick!" Well he knew the use and purpose of umbrellas for if it were raining and any member of the household were preparing to go out he would advise, "Better take a 'brella."

When desired to exhibit his powers of speech for the benefit of visitors, Ikey took malignant delight in being obstinately silent. No oyster was ever more dumb and nothing could coax him into any sort of utterance. Through it all his bright, round eyes would be keenly alert, expressing the intense gratification he felt in being stubborn and aggravating.

In warm weather though, from his cage in the window-sill, he would address passers by. Our house was opposite the medical school and the successive classes of students soon knew Ikey. They delighted in provoking the bird and getting him to talk back and to using his ready and comprehensive flow of strong language. The boys would stand across the way and tell Ikey uncomplimentary things about himself. He promptly rejoined in vigorously personal remarks, craning forward and giving as good as they sent...Frequently the exchange of academic personalities became so fervent that Ikey had to be brought back into the room and covered up. This he fiercely resented and let us know that we were tyrants and most unfair; just when it had become so interesting and just as he was getting the best of those fellows across the way.

All the college yells Ikey had at his beak's end and of all his songs the old Boola song was the bird's favorite. Athletic days were his festive occasions for he could join in the noise and really be one of the gang. When the students came down the street singing *Boola,* Ikey would catch the sound before any of us and he would become positively hysterical in his excitement. Through the open window, he would join in the song, although he always sang a note or two behind the rest. What he lacked in time and rhythm, he more than compensated for in volume of sound however, for without half trying, he could outscreech the whole city.

The bird knew colors too and the crimson Harvard flag would goad him into frenzy. This was not because of the color for he liked red dresses and ribbons but because it was Harvard's flag and Ikey was the staunchest partisan and "rooter" that Yale ever had. Give him a little Harvard flag and he would tear it into shreds and trample on them, whereas if handed the Yale colors he would hold them in his beak, strut jauntily back and forth on his perch and rhapsodize about it in the parrot's native tongue.

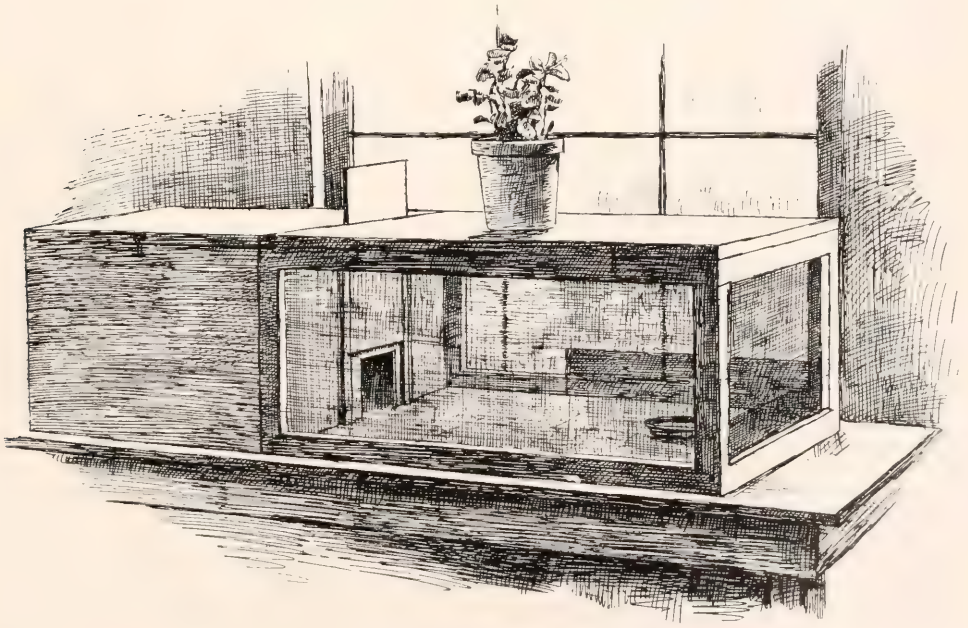
He liked to have his head scratched and would often say, "Ikey's got a headache. Po-or Ikey. Scratch Ikey's head." He was generally accommodated but it had to be done with caution and with a long pen or pencil for the bird was treacherous and gladly used his cruel beak whenever he got an opportunity. While his talents were high his disposition was low and in addition to his cruelty he sat for hours planning mischief of the most impossibly ingenious kinds.

Two cats and a dog were regular inmates of the house and sad experience had taught them to give that horrible bird a wide berth. When no person was in the room Ikey would drive the animals out by the sheer power of speech—a veritable triumph of mind over matter. Words were poured at the animals in torrents, addressed in turn to each by name so there should be no possibility of mistake. At different intervals the sounds affected the targets at which they were aimed, the fox-terrier being the first to yield. He would slink from the room in honest, abject fashion, not attempting to disguise his disgust and ignominy. The

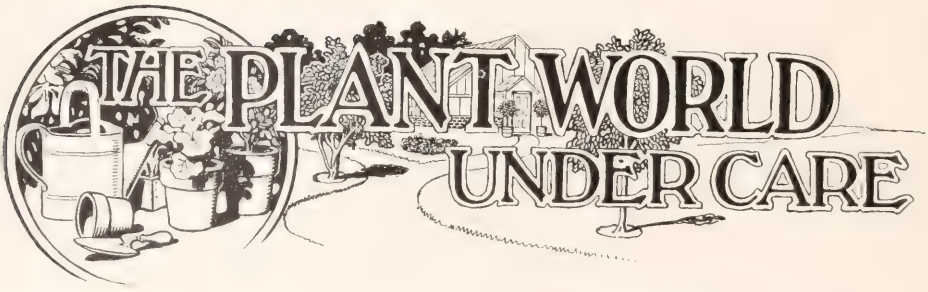
cats pretended not to notice for a time and would feign sleep but Ikey had unlimited patience, strenuosity and willpower. Finally Buttons would dash away and later Gipsy would rise with dignity and stroll off as if he had just remembered an engagement, one which there was plenty of time to keep however.

While speaking of the parrot's treatment of animals, one incident is well worthy of recording, incredible though it may sound. It was one of the instances which suggested metempsychosis or obsession. A neighbor had left town on a visit and placed her cat with us for safe custody. The cat had only come in that day, consequently had not acquired that prudent respect for Ikey which our own animals had learned. The cat lay asleep near Ikey's cage twitching her tail as if dreaming. Ikey crept down near the bars, watching the tail with fascinated interest and with ulterior intent. So near and yet so far; one felicitous movement might bring that tail inside his bars! I was busy sewing and at last, fearing that the psychological moment might come for Ikey, I ordered the cat to go downstairs. After several commands, the cat started from the room. Ikey climbed up on his perch and leaned over, watching the cat as it disappeared down the steps. Then he crossed to the side of the cage nearest me, looked squarely at me and said, very distinctly and deliberately, "Now you shut up and go down stairs too." I looked at the bird in amazement and Mother, who was in the next room, hearing what the parrot had said, exclaimed, "Aha, you got your orders, didn't you?"

Needless to say, Ikey's vocabulary of violent and inadmissible words was acquired before he came to us and to do him justice he was very discriminating in his choice of language, using the verbiage of polite society with us. But let the butcher's boy taunt him or the students encourage him and he would gleefully unburden himself of the choicest epithets of a deckhand. This was a practical instance of "like begets like" and Ikey had the admirable faculty of adapting his conversation to his company—another proof that he had a good idea of the specific meaning and value of words.



A GOOD SUGGESTION FOR A CAGE FOR PETS.



THE MOST WONDERFUL PLANT IN THE WORLD.

To assert that any plant is the most wonderful in the world is, I know, to make a serious, weighty, grave statement, and there are naturalists who may not agree with my opinion as to the supremacy, in that regard of this particular plant. But I am referring to the sensitive plant (*Mimosa pudica*), and after three years of extensive experiment with it; after carefully watching it at all times, by day and by night, in early spring, and in late autumn; after experimenting with it by a variety of methods; and after having frequently entertained my friends with an exhibition of its remarkable characteristics, I am prepared to assert positively and unqualifiedly that it impresses me more strongly and more deeply than any other plant with which I am acquainted. It makes me realize more and more fully that Thoreau was not far from the truth when as he walked alone in the valley in Maine, he addressed a pine on the distant mountain top as if its life were closely akin to his, and as if there were a possibility, yes, even a probability, that it was as much entitled to immortality as are



BEFORE SHAKING.



AFTER SHAKING.

certain so-called higher forms of life.

Surely the more one studies the sensitive plant, the more one must realize that it is alive, and who am I to draw distinctions between one life and another? Can there be more than one kind of life? Are not all forms of life merely the opposite of death? If so, why not admit or even assert that plant life differs from ours only in quantity. This is not merely fancy. Let us go to the plant itself. For a few cents, seeds may be obtained from any seed house, and the plant grown in any bed in the garden as easily as turnips, beets or lettuce. In fact the soil requires about the same treatment for the sensitive plant as for turnips, and the method of sowing the seed is practically the same as for any garden vegetable.

I have, however, in my third season's experiments found it a great advantage to have several plants growing in boxes or in flower pots. By this method one can get a side view more readily and successfully, so as to be enabled to study the wonderful movements of the leaflets, or of the leaf-stalk as a whole, than when the plants are sprawling over the ground like unsupported tomato vines.

The accompanying illustration shows a profuse growth in a box about eighteen inches long, ten inches wide and five inches deep. This box was set on a table in front of a white sheet and a view taken of the plants in their normal condition. The plate was then changed and another view taken after their peculiar and characteristic movements had followed the intentional disturbance. Perhaps the logical method would have been to reverse this process, and to take the normal appearance first but I disturbed it by moving it from the greenhouse platform, so that all the leaflets were closed when I placed it on the experimental table, and I had to wait for nearly five minutes before the plant lost its fear of the intruding enemy, if I may use the expression, and gave me the open view that I then desired.



FOLDED LEAFLETS. OPENED LEAFLETS.
To show sensitive hairs.

I found it interesting to run a finely pointed instrument like a pin, or the tips of my tweezers, along the line of the central vein of each leaflet and to see all the leaflets close. This suggested that I should try to bring about the movement without actually touching the central vein; that is, touching only the hairs, and I found that these appendages may act as feelers. The next thought was to photograph the centre of one of these leaves so as to show the arrangement of the hairs along the central vein. But I found this is no easy thing to do. It was like photographing a living animal, the difficulty being in catching it and in inducing it to remain quiet long enough to accomplish the photographic exposure. I had to resort to subterfuge, or, in other words, to set a trap for the plant about the same method that one would use in catching a wary animal. I took two glass slips, two inches long and one and one-half inches wide and placing one under a leaf, waited until it was wide open, and then suddenly clapped down on it the other glass slip, thus catching it by a method similar to that old fashioned one of catching house flies between two shingles smeared with molasses. As in catching flies I found it difficult to be quick enough to catch the leaf before it could get away or, in other words, before it started to close. After repeated trials I succeeded and, binding the whole together firmly, I obtained a photograph which is really a silhouette, but it shows well the hairs along the central vein.

Then I disturbed another leaflet, and put it before the camera after the leaves had closed. It was evident that these hairs do act as feelers and inform the plant that an enemy or a disturbing element is near by.

Slight disturbances are followed by the closing of the leaflets only, but a sudden jar causes the entire leaf-stalk to bend downwards. I observed that this bending was accomplished at one particular part of the petiole, and I



WHERE THE SUDDEN BENDING IS DONE.



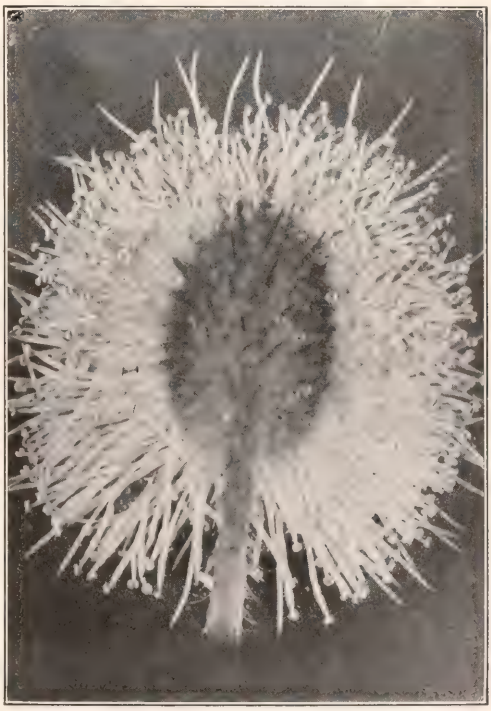
THE BULBOUS BLOOM.

found it comparatively easy to make the entire leaf-stalk bend by irritating this special spot, and in doing so to have no end of amusement for myself and my visitors.

Perhaps one of the most interesting experiments was slowly and carefully to place one blade of sharp shears above and the other below the tip of a leaf, and to close them quickly without any lateral movement, so as to make it purely a cutting of the tip, and not a jarring of the leaf. The result was indeed surprising It seemed as if the plant was a little sluggish of comprehension and did not realize, until some thirty seconds afterward, that it had been injured. It reminded me of the old story of a very long arm, the fingers of which upon injury, did not convey the impression through the line of nerves until an appreciable length of time had elapsed. It seemed as if the information had to be telegraphed to some central point and the answer to come back, "You had better shut up, something injurious is going on around you." Then indeed the method of closing was curious and totally unlike that resulting from a sudden jar. It seemed as if the sensation ran slowly from the tip up the leaf, or rather as if each pair of leaflets in slow succession passed the news along that, "We have been told from headquarters that we should shut up."

Another interesting experiment may be performed by bringing a lighted match near the leaflets, and watching how rapidly the word is given out to the plant that, "It is getting a little too warm for us here." Every experienced teacher who has observed how slowly an idea percolates through the mind of some children, would here be reminded of that as something similar takes place in this plant, when a new idea trickles along its sensitive tract. It seemed as if it took some time for the sensory region to comprehend the event, and to discover that it was really true.

The bloom of the Mimosa is wonderfully beautiful, but it is not sensitive. I have photographed two of the flowers, one as it naturally is, the



BLOOM PRESSED BETWEEN TWO GLASSES.

other as it appears when pressed between two slips of glass.

When I spoke above about stimulating a certain portion of the petiole, and having that act followed by a falling of the leaf and the two leaflets, I was referring to that special portion which botanists call the pulvinus. This region is a thick, cylindrical swelling at the bases of the petiole and the stalks of the leaflets. It is at or through these pulvini that the results of the stimulation are exhibited, for it is at these points that the flexure takes place. The mechanism of this is understood, but not the method by which the transmission of the influence is accomplished. This remains as much of the mystery as it was when first observed. The leaves and their parts fall because a sudden change takes place in the water-pressure within the cells that form the pulvini. When the cells on one side of the pulvinus give off water, which passes into the spaces between the cells, a curvature toward this side results from the unchanged pressure of the turgid cells of the opposite side. The sinking of a leaf upon its petiole is due to the relaxation of the cells of the lower side of the pulvinus. When these cells reabsorb the water from the intercellular spaces, their former size and shape are slowly regained, and the leaf is returned to its former position.

The manner by which the irritation, or the stimulation, is conveyed from one part to another, is not known. Many and various theories have been offered in explanation, but none is entirely satisfactory, and none responds properly to actual test. The stem may be girdled, as has been done, yet the influence passes that part about as successfully as it passed the region when it was intact and uninjured, thus proving that the transmission takes place through the wood.

Several sections of the stem of the same plant have been killed by the applications of bandages kept saturated for several minutes with boiling water. In such a case, too, the transmission is not hindered, thus proving that dead wood is no barrier.

The continuity of protoplasm is a beautiful structure, readily visible with the microscope, in the tissues of various plants, the colorless protoplasm passing through the cell wall in the form of delicate threads and processes, to join similar filaments on the opposite side of the same cell wall. One of my friends who had become greatly interested in this microscopic structure, imagined there might be a continuity of protoplasm in the cells of Mimosa, and as at that time he had no Mimosa within his reach, and no means of cultivating it, he sent to Paris for a microscopical preparation of a section of the stem, hoping, that by a fortunate chance, he might see what he thought might exist. But the dealer had thought more of the beauty and the neatness of the section, than of its value as a scientific object. The consequence was that every cell was as empty as any other vacant space, and the preparation was valueless. If those readers who have access to a number of sensitive plants, and have the ability to cut and prepare microscopical sections, would bear this inference in mind, it would be interesting to know whether or not such a continuity exists.

It is not believed nor imagined that the motor influence is transmitted through these continuous threads of protoplasm, provided they are present, but the thought is suggestive, and to know whether or not such continuity is present, would be an acceptable addition to our knowledge.

The motor influence may, in vigorous plants, be transmitted for a distance of about seventy centimeters (or about twenty-eight inches), at the rate of from one-third to one inch a second.

The utilitarian purpose for which the plant is supposed to have developed its sensitiveness to shock or to touch, is said to be for protection, especially from browsing animals. It grows in great profusion in tropical countries, especially on the plains of Brazil and of Venezuela, where it forms immense patches. "A recent writer says: "When a browsing animal approaches a clump of Mimosa and agitates any part of it at all strongly, the green appearance disap-

pears at once, and only an apparently withered clump in which the hard and prickly stems are most conspicuous remains; the consequence being that the animal either turns away or passes through the clump to less bewildering pasturage."

A common plant in our northern fields, (*Cassia Chamaecrista*) has some of the habits of Mimosa, although to a much less extent and degree. It is a sensitive plant, and will respond by the closing of the leaflets, but it demands rather a severe blow, or somewhat prolonged irritation if that is slight or delicate. The parts will close tightly after repeated and rather severe shocks, or after the stem has been carried loosely in the hand for several minutes. But (*Cassia Chamaecrista*) is the sensitive plant of the northern fields and highlands, and deserves respectful consideration on that account. It and the Mimosa belong to the same botanical family, the Leguminosæ. *Cassia nictitans* of New England and of the west, is similarly sensitive.

I have had great enjoyment in studying the details of the pollen mass on these globular heads. Every person who saw the plants either in the garden or in the greenhouse, exclaimed with astonishment at their wonderful movements, but it is a greater wonder to me that so many intelligent observers deprive themselves of the pleasure to be obtained by studying the sensitive plant. It is not difficult to grow. Then why not this coming year have at least a pot or a box of earth in which a few of them may be cultivated? There are many things about the plant that are not yet known, and you, perhaps, by persistent observation and experiment, may be able to add to our knowledge.

Aside from my own personal experiments and observations, many of the scientific facts here mentioned I have obtained from a delightful little book, entitled "Living Plants and Their Properties, a Collection of Essays," By Professors J. C. Arthur and D. T. MacDougal. 16 mo, pp. 234. Baker and Taylor, New York.

THE AGASSIZ ASSOCIATION

FORMATION OF CHAPTERS.

The best plan we have yet discovered is to organize local branch societies, or "chapters" as we call them.

These chapters may consist of four or more members and may pursue any line or lines of scientific study they choose. It is an excellent plan to make a careful study of your own town until you are thoroughly acquainted with its plant and animal life and the minerals it produces.

Most of the great observers made their observations close by home. Gilbert White watched the swallows that nested under the eaves; Darwin studied the angle-worm in his garden; Agassiz drew the fishes that he caught in the neighborhood brooks; Palissey found his fossils near his own dwelling.

So we like to set people to work just where they are living. We like to have them make local museums, in which they shall have complete and well-labelled collections of the plants and minerals to be found within a radius of five or ten miles from their door.

Such societies have already been formed in over a thousand towns and cities throughout the United States and Canada. There are several abroad, in England, Australia, Russia, Tasmania, and New Zealand, all united with one name and one purpose, exchanging specimens, and corresponding with one another on matters of common interest.

The union of kindred students promotes the interest of each. Every one who finds anything wants some one he

can show it to. A pleasure shared is a pleasure doubled. At the meetings every member is sure of an attentive and friendly audience.

Then, too, you can do many things as a society that you could not do alone.

You can purchase good books and apparatus; start a library, build a cabinet; rent rooms; engage lecturer; take excursions.

To the student a day outdoors redeems the whole calendar. Lungs expand, eyes brighten, pulses quicken, the step becomes elastic. The mind is challenged at every step. Each pebble is a problem, each plant a puzzle. There is food for thought for every age and for every degree of mental power.

Having now set forth the motives which have led us to desire a union of local societies for the personal yet united study of nature it only remains to explain why we chose to give to our association the name of Agassiz.

It is not merely because he was a famous, a world-renowned scientist, although he stands among those most highly honored; it is not because he left the cross of Switzerland under which he was born for the Stars and Stripes under which he died; it is not because of the important contributions he made to the sum of human knowledge during his life of patient study; it is not alone on account of his consecration to the cause of truth, nor his legacy of the remembrance of a life consistently devoted to the advancement of science; any one of these would have justified our choice, but the name that was adopted draws its most inspiring power from the fact that Louis Agassiz lived his life under the control of three distinct and abiding convictions. He believed that he who would learn of Nature her deepest truth, must wrest it from her by personal encounter; he believed that no knowledge and no habit of thought is too good for all the people; and therefore he freely bestowed on others the learning which he had himself acquired, in the only way which any knowledge can be imparted, by teaching others how to study, and by affording them the means of study; and finally, he believed in the existence and protecting care of a divine Creator, and he regarded this beautiful world whose structure he knew so well, not as a prison whose walls are closing on their inmates with the doom of death, but rather as one of the chambers in a heavenly Father's mansion, from which death is but a door opening into larger and brighter rooms beyond.

Our thought of Agassiz delights, it is true, to contemplate him as a young and ardent student, bending in sleepless interest over the fishes of Neuchatel; we honor Agassiz, the philanthropist, as he toils with unflagging energy to found the museum which shall forever lead his countrymen to clearer views of the order and unity of nature; but our hearts go out most lovingly to Agassiz, the revered and reverent teacher, as he pauses for a moment in silent prayer before opening his famous school in Penikese:

"When the Master in his place,
Bowed his head a little space,
And the leaves by soft airs stirred,
Lapse of wave and cry of bird,
Left the solmen hush unbroken,
Of that wordless prayer unspoken,
While its wish on earth unsaid
Rose to Heaven interpreted."

Invitation.

We invite you to join us in our delightful work. Organize a Chapter in your town. Only three besides yourself are needed.

If this is not convenient, join us by yourself. Full directions in Handbook. We bespeak the co-operation and assistance of all parents and teachers, of all interested in the study of nature and natural science, useful employment, healthful recreation, and a knowledge of the outdoor world; we invite especially all young people, boys and girls, young men and women, to join our ranks.

DESERTED BIRDS' NEST.

The Rev. P. B. Peabody, Blue Rapids, Kans., in connection with his work on the Advisory Council of The Agassiz Association, desires particularly to urge upon all bird-lovers the critical study of deserted birds' nests, during the winter and early spring. Of identified nests careful notes as to location and elements of concealment should be made; and analysis of material and structure should be made and recorded. Mr. Peabody will gladly

identify any small nests that may be mailed him; when accompanied by reasonably full data, and by postage for reply. Moreover, any inquiries will be most cheerfully answered.

Bird photographers will find autumn, winter and spring a golden period for the photographing of nests in situ. A back-ground of neutral tint or of black or brown should be used, where feasible; care being taken to set it well back from the nest. Where the nest and its surroundings are laterally deep, the lens should be well-stopped down; and under no circumstances should photographs be taken in sunlight (where avoidable), nor should snap-shots be considered of even potential value. The above suggestions cover the more glaring common faults. In this domain, also, any possible help or suggestion is heartily at the service of any members of the Agassiz Association. The two-cent stamp is the *sesame*: and it will always be adequate.

STUDYING DRAGON FLIES.

REPORT OF CHAPTER HALLOWELL A. NO. 535.

The work has been in a great measure the collection and study of dragon flies. During the season of 1908 over forty species were seen or captured, bringing the number of known species from this locality up to a little over seventy now in all.

The exceptionally dry weather gave destructive insects great opportunities for injuring fruit and forest trees. Many beech trees were entirely stripped of leaves by caterpillars and some trees commenced to bear leaves again in the fall. I await with interest to see what effect this will have on the trees another season.

There were no rare birds seen during the season.

MATTIE WADSWORTH, PRESIDENT.
R. F. D.,
Hallowell, Maine.

LITERARY AND BIOGRAPHICAL

With The Trees. By Maud Going. New York: The Baker & Taylor Company.

This book contains chapters,—"When the Sap Stirs," "Keeping Tryst with Spring," "The Life of the Leaves," "In a Hillside Pasture," "The King of the Trees," and "Seed Time and Sowing," and others of interest. It is popularly written, and is a pleasing accompaniment to any of the more pretentious or systematic books pertaining to trees.

Plant-Breeding. Comments on the Experiments of Nilsson and Burbank. By Hugo de Vries, Professor of Botany in the University of Amsterdam. Chicago, Illinois: The Open Court Publishing Company.

This book is designed to show the agreement between the author's theories of mutation and the work of Luther Burbank and other eminent horticulturists (especially Nilsson, the Swedish horticulturist) in actual practice. It is therefore a basis for further development of practical breeding as well as of the doctrine of evolution.

The book contains one hundred and fourteen illustrations. It is of general interest.

Plant Physiology. By William F. Ganong, Ph. D., New York: Henry Holt and Company.

Everybody likes to make experiments, especially on living things. That is why the boy catches flies and pulls off one leg, two lgs, three legs, and so on; he wants to see what the fly will do under the new conditions. So he pulls off a wing, or clips both wings, to see what the fly can do with only one wing, or with two half wings. He is generally msunderstood, and is called a cruel, heartless boy, when in fact, he is not thinking of hurting the poor fly, but is only intent on seeing how it will act. This is not a defense of cruelty, it is merely a defense of the boy, who has no thought of being cruel, but who is intent upon making his little experiments.

And so, too, we all like to make experiments upon anything, even upon plants, especially if they will respond to our attentions. Who does not like to tease a Sensitive Plant (Mimosa) to see how it will respond when touched this way or that way. Watch the next person that you show a

Sensitive Plant: see how he tries the effect of a touch here, and a touch there; of a very gentle touch, and a rude one; of a jar, a breath, a puff or a blast of air. It is all very interesting. And so are very many more similar experiments and observations on plants when we know how to go about them;—as how a plant bends toward the light; how an inverted leaf will as persistently turn over as will a turtle or an insect, only of course it doesn't do it as quickly. Then, too, there are the movements of roots, and tendrils "just as though they are alive," as an excited student once said to me. And there are the odd things about the growth of plants, how they grow more rapidly in one part of the day, and less rapidly in the other, and how to measure the rates of growth. Nor must I forget the growth of roots down, and of stems up, and the ways of showing that this is not in response to light. All these and many more things are taken up in Professor Ganong's very interesting "Laboratory Course in Plant Physiology" (second edition) which has just been brought out by Holt (New York). With half tones of photographs, with cuts, and diagrams the author shows most attractively how the apparatus is made, and how applied to the plant to make it "act up" under such conditions as will make it easy for us to see it act. As one turns over the pages he longs to have the time to try this or that experiment, and I venture the prediction that in any school, and for any reader it will always produce this effect. We should all be boys again, watching actions of our plants if we followed our inclinations after reading the suggestions in Professor Ganong's book.

And it is worth our while to find out how living plants act, for it is only through a knowledge of this kind, that we may know the plant in health, and this again enables us to know the nature of disease in the plant. This then opens the door to a vast field of inquiry of the greatest importance to the scientific botanist and also to the practical plants of all kinds.

CHARLES E. BESSEY.
The University of Nebraska.

Field, Forest, and Wayside Flowers. By Maud Going. New York: The Baker and Taylor Company.

This is a popular book designed to meet the needs of those who love to observe the beauties and the wonders of familiar plant life, and yet who do not wish to become actual students. Doubtless a careful reading of it will create a desire to do more careful and serious work in plant study, than is within the scope of this book.

Plates of 150 Fixed Stars Used in Navigation. Compiled by Robert E. Tod, Master Mariner. New York City.

While this is professedly, as insisted on by the title, for use in navigation, it is of ideal use for the amateur astronomer or for class use. The first plate is of Ursa Major and Ursa Minor; the last is of the stars near the South Pole. Each of the intervening eight plates shows forty-five degrees of Right Ascension. This is an ideal arrangement for the study of the stars of the zodiac and those neighboring, north and south. The division into maps of forty-five degrees or three hours each is a good suggestion for the star student, be he navigator or astronomer. The writer sincerely hopes there will be an edition issued for general use. After straining one's eyes with the microscopic names on the ordinary planisphere or turning around circular star maps to find "which way does it go," it is indeed a pleasure to use this set of plates which are clear with the names easily readable in a book to be opened and used in a common sense manner, right side up like any other book.

Cummings's Nature Study For Primary Grades. By Horace H. Cummings, B. S., Former Supervisor of Nature Study, State Normal School, University of Utah. Cloth, 12mo, 180 pages, with illustrations. Price $1.00. American Book Company, New York, Cincinnati, and Chicago.

A helpful teacher's manual for the first three grades. The children are interested in the various forms of life by constant appeal to their instinct to investigate and their love of imitation. The outlines given, to be developed by the teacher, are based upon familiar experiences and facts, and many field lessons are arranged for. Pupils are encouraged to make original observations and experiments, and to give natural principles their practical applications. In addition to animal and plant life, the lessons deal with physics, physiology and hygiene. Suggestions are given for making apparatus and materials and for caring for a school garden. The many illustrations are clear and helpful. The book is the result of over ten years' test of the lessons in the class room, and is suitable for use in any part of the country.

Castle Stories. By Castle Girls. Tarrytown, N. Y.: The Castle.

While this book is not within the scope of "The Guide to Nature," I take pleasure in calling attention to it as a personal favor to the school and to the young ladies who have written the stories in the book. One of the writers, Miss Florence Vorpé, has not only good literary ability, but is a diligent student of nature. We hope that she will combine her talents of general literature and of accurate observation and produce a nature book that will not be mere "stories," but will be a genuine contribution to our nature literature.

THE GUIDE to NATURE

STAMFORD, CONN.

EDWARD F. BIGELOW, Editor

Vol. 1 MARCH, 1909 No. 12

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THE PHOTOGRAPHIC TIMES

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Address after April 1st:

EDWARD F. BIGELOW

ARCADIA SOUND BEACH, CONNECTICUT

PUBLISHER'S NOTICES

The Guide to Nature.

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AN ILLUSTRATED MONTHLY MAGAZINE FOR ADULTS. DEVOTED TO COMMON-PLACE NATURE WITH UNCOMMON INTEREST.

PUBLISHED BY THE AGASSIZ ASSOCIATION. OFFICE: 113 GROVE ST., STAMFORD, CONNECTICUT

Subscription, $1.50 Per Year. Single Copy, 15 Cents.

Entered as second-class matter, April 6, 1908, at the Post Office at Stamford, Conn., under the act of March 3, 1879

Vol. I MARCH, 1909 No. 12

SUBSCRIPTION REDUCED TO ONE DOLLAR.

Beginning with the next number, THE GUIDE TO NATURE will be issued from Arcadia, Sound Beach, Connecticut, at subscription of only one ($1.00) dollar a year.

Our equipment supplied by the naturalist-philanthropist, as explained in the January number of THE GUIDE TO NATURE, includes facilities for handling a larger edition and attending to more extensive correspondence. It is believed that this reduction in price of subscription will not only increase our income, but will also broaden and extend our work in the knowledge and love of nature. The reduction is made, therefore, wholly in the reasonable expectation of greater good to greater numbers. To that end we earnestly solicit the co-operation of every subscriber to THE GUIDE TO NATURE and of every member of The Agassiz Association.

An additional subscription to Volume I or Volume II sent at the same time for self or to be sent to another address, will be only seventy-five (75c) cents. Thus two years' subscription beginning with the April, 1908, number is only one dollar and seventy-five ($1.75) cents. Two years' subscription to self and also to a friend three dollars and twenty-five ($3.25) cents.

At these very low rates we expect to more than double our list. To our staunch friends, we appeal: Do not send less money in your renewal but SEND MORE and extend the circulation among your friends.

We can still supply a few complete sets of Volume I. These, do not forget, are one ($1.00) dollar if ordered alone. If ordered in addition to another subscription, are only seventy-five (75c) cents.

The advance time of all subscriptions paid at the old rate of one dollar and fifty ($1.50) cents a year will be increased fifty (50%) per cent.

SUMMER SCHOOL IN CONNECTICUT.

PERSONAL.

To Our Subscribers and Members of the AA:

I am going to try to establish a summer school of nature in Arcadia, Sound Beach, Connecticut, per the announcement in the advertising pages of this number. If this attempt is successful it will be the third I have established in Connecticut.

After an extended experience of several years as pupil or as lecturer at summer schools in Kingston, Rhode Island; Woods Hole, Massachusetts; Cold Spring Harbor, Long Island; Cottage City, Massachusetts; Cornell University, Ithaca, New York, I formed the plan of the first summer school of nature to be held in Connecticut.

In January, 1902, I went to the Connecticut Agricultural College at Storrs and proposed an annual summer school of nature and country life. My suggestions were adopted and I was elected Director for the first session of 1902. That school has steadily grown and I am informed that the outlook for the coming session is very favorable.

In 1903, the management of the Connecticut Chautauqua requested that I establish a nature school at Forestville. I accepted this offer and was Director of the school for 1903 and 1904. In the second year, because of the growth of the school, I engaged Mr. Willard N. Clute of Joliet, Illinois, as my assistant. He proved very efficient, as would be naturally expected by any one who had known as I had for many years his enthusiasm and abilities as a naturalist. In 1905 I was called to Michigan for a month in the summer schools of that state. Mr. Clute was appointed Director of the Forestville school and has since filled the position most admirably. That school is a decided success and increases in attendance every year.

For the past three years I have been on lecture tours during almost the entire summer, visiting a week each in summer schools in Georgia, Alabama, West Virginia, Ohio and Indiana. This year in August and September I am going to the South and Middle West for a few weeks. But I am reserving from the middle of June to the middle of July to establish this third summer school in Connecticut. There is at present no school of popular nature on the Connecticut shore. I believe that a state that has a larger proportion of beach to its size than has any other in New England should have a beach school and it is going to have one at the ideal place, Sound Beach, Connecticut. This is located in the very best of the summer resort territory and is easily accessible from New York and also from the near by resorts of Rye Beach, Greenwich, Shippan Point and Stamford.

The school will be established on the unique plan of having the price of tuition and the course of study assigned by the pupils. This does not mean that the school is free nor that there will be lack of system. It means that you will contribute towards the expenses of the school, of Arcadia and its Agassiz Association according to your ability. It means that the work of the school will be adapted to your needs. It is suggested that there be two divisions—one for those say above eighteen or twenty years of age and one for those below. One division will hold sessions on Monday, Wednesday and Friday; the other on Tuesday, Thursday and Saturday. There will be an outing in the forenoon and an indoor session in the afternoon. A union session for all will be held on certain evenings for illustrated lectures or for study of the stars.

This is your school. Tell what you desire and what you are willing to contribute. I desire hearty co-operation and will contribute all my time. What you pay will go directly to the work of the AA and allied interests of Arcadia.

Yours fraternally in the love and study of nature,

EDWARD F. BIGELOW.

Arcadia,
Sound Beach,
Connecticut.

I find "The Guide to Nature" a great success.—Wilson Morse.

I could say a great deal about the interest I feel in your efforts to increase the interest in nature study, but for the present I would suffice to say that I wish you to consider me one of the friends of your magazine. I want to wish you every success.—F. J. Schwankovsky, Jr.

THE GOERZ DAGOR.

This is a "prize" and a joy forever. It is beautiful and efficient. Send for catalogue. Get a better lens on your camera. Then go forth and capture the scenic beauty of spring and send a specimen of the photographs to THE GUIDE TO NATURE.

We desire more and better photographs.

And really, I think, some of you not only desire but *want* them too.

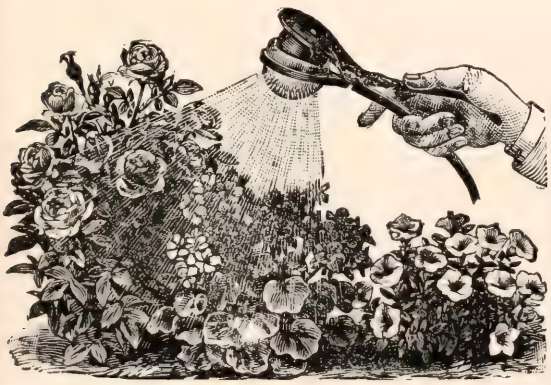
GROW ROSES.

Is there any more beautiful flower than a rose? Why do we easterners not appreciate roses as do the people of California? They can be grown nearly as well here as in California, and almost any town could have a rose parade in June or early July as does Pasadena on January 1st.

The way to get roses in such profusion is to buy them of The Conard & Jones Company, West Grove, Pennsylvania, and do the actual work as instructed in their book, "How to Grow Roses." Invest a small amount of money and a liberal supply of "heart" and success will surely be yours.

JUST THE THING TO SAVE THE PLANTS.

Any one desiring to procure an excellent hand plant sprayer to spray the leaves upon indoor plants, to keep the insects off and otherwise keep them



healthful, should send $1.00 to The G. N. Lenox Sprayer Company, 165 West Twenty-third Street, New York City, and receive one by return mail. This sprayer will spray under and over the leaves. Three cakes of tobacco soap to make a spray solution will be included.

THE NEW SCHWAN LIGHT.

This is literally a new light and not merely another device for holding the well known older forms of light. The method of illumination is on a new principle and is a success. The light is clear and steady and therefore excellently adapted to the projection lantern or to photography. Send to Chas. Besceler Company, 251 Centre Street, New York City, for full particulars.

MANY IMPROVEMENTS.

The Arcadia equipments not only induce the reduction in price of the subscription to THE GUIDE TO NATURE but will enable us to produce a far better magazine.

The work of the past year has been done under almost incredible disadvantages. Arcadia includes the facilities of editing, correspondence, illustrating, experimenting, etc. as explained in the January number.

Volume II will be improved in many respects, including a new cover of neat and unique design which will be held, with only seasonal changes, throughout the year. Several new features are to be added and a general increased interest in all the old ones. Among the additions will be an Aquarium Department under the auspices of the Aquarium Society of Philadelphia, under competent and authoritative editorial supervision of that society. No phases of nature are more interesting than those seen in well managed aquaria. THE GUIDE TO NATURE in Volume II will tell how best to get at these interests. An illustrated article, "The Household Aquarium," in the April number is alone well worth the price of a year's subscription.

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Dr. CECIL FRENCH, Naturalist
Washington, D. C.

"FIRESIDE PHOTOGRAPHY."

"Fireside Photography," the latest in the series of photographic publications issued by the Bausch & Lomb Optical Co., has just been received, and we find it of unusual interest. The book contains thirty-two pages, 6″ x 9″, and carries fourteen illustrations reproduced in dual tone sepia. For several of the studied floor plans are given in order to assist others in obtaining like results in their own homes. Aside from the pleasing execution of the book and the attractive cover, "Fireside Photography" is of value because of the lighting methods described, the brief explanation of the advantages to be gained by the use of an Anastigmat, and the concise description of the various objectives listed for such work.

We can recommend this publication to our professional and amateur readers. It will be sent gratis upon request by the Bausch & Lomb Optical Co., of Rochester, N. Y., or it may be obtained at your dealer's.

SPEED PHOTOGRAPHY.

The photographer, whether amateur or professional, who does not attempt some line of speed photography, is rapidly becoming the exception. For all there is some disappointment in store and frequently something happens to produce features in the negative which were entirely unexpected and which are altogether unwelcome. The "Prism" for February is of particular value because of the interesting way in which the reasons for many failures are brought out, and because of the suggestions which are given to guide aspiring speed photographers towards success.

One of the things that may not have occurred to you is that one must be trained so that the muscles will respond instantly to the brain's command to push the button at the exact moment the image of the moving object occupies the space desired on the ground glass. The lack of this quick nervous reaction accounts for the misplaced object on the plate and is the reason for missing it altogether, as is the experience with many beginners

Many other points of interest are taken up, the illustrations given are worthy examples of unusually good speed work, so that taken all in all this issue of the magazine should be appreciated by the photographers generally. The February "Prism" may be had upon request without cost from your dealer, or it will be sent to you by the Bausch & Lomb Optical Co., Rochester, N. Y.

I thought "The Observer" the best magazine I ever read and am pleased to know that you are again editing a magazine for "observers."—Mrs. Susan Tucker.

Lectures by Elliot R. Downing, Ph. D.

Professor of Biology, The Northern State Normal School
Marquette, Mich.

The Significance of Nature Study Movement. Our Friend the Dog—A discussion of methods and materials in nature study. **The Making of the World**—An outline of evolution. Illustrated with stereopticon slides. **William Wordsworth, the Naturalist's Poet Laureate.**

PRESS COMMENTS

Professor Downing, of the Marquette Normal School, delivered a fine lecture at the high school last night before a large and appreciative audience on "The Making of a World." Mr. Downing is a fine speaker, and was thoroughly conversant with his subject. The lecture was beautifully illustrated by stereopticon views.—Menominee (Mich.) Leader.

Members of the West Side Fortnightly Club and their friends enjoyed an excellent lecture yesterday afternoon at the Public Library by Dr. E. R. Downing, of the State Normal School at Marquette, Mich. Dr. Downing is a very pleasant speaker and interested his hearers from the very start, and there was not a moment until the close but what was enjoyed. —Beloit Wis.) Free Press.

If you are planning a lecture course or in need of a single address, correspondence is solicited.

Address:

E. R. DOWNING

1216 Presque Isle Ave., Marquette, Mich.



This small cut shows the head of the great Imported Collie, "Parbold Provost," winner of special for the best Collie dog at Madison Square Garden, New York Show, 1909.

He is the longest headed and most beautiful Collie living and the greatest sire.

I have some matrons bred to this grand dog and some splendid puppies by him for sale at reasonable prices.

Full list and particulars cheerfully furnished.

APPLY TO

WILLIAM C. HUNTER

Chambersburg, - Pennsylvania



A MAPLE SUGAR "CAMP" AT SUGAR HILL, NEW HAMPSHIRE.

An advance on the methods of a century ago. (See page 438 for ancient method.) The sugar season is at its best in this region the last of March or the first of April.

Photograph by Reverend L. S. Nickerson.

The bluebird comes, and with his warble drills the ice, and sets free the rivers and ponds and frozen ground. As the sand flows down the slopes a little way, assuming the forms of foliage when the frost comes out of the ground, so this little rill of melody flows a short way down the concave of the sky.—*Henry David Thoreau.*

The Guide to Nature.

EDUCATION AND RECREATION

Vol. I MARCH, 1909 No. 12

THE OUTDOOR WORLD

Study and Photography of Snow Crystals

BY WILSON A. BENTLEY, JERICHO, VT.

I HAD a natural (inherited) love for nature and for prying into nature's secrets, which manifested itself at a very early age. I took delight in my early "teens" in observing and studying clouds, minerals, hoar frost and other natural objects, but most of all the snow crystals from cloudland. There was something about them that attracted me. They appealed to me not only because of their beauty of form but because they came from that mysterious and then but little known cloudland above. So much mystery enshrouded their place of origin and manner of growth that I wanted to learn somewhat about them. Here was a realm of nature awaiting investigation and sure to reward the prospector. For some years I took delight in observing them under a microscope and in making hundreds of drawings which, as I afterward learned, utterly failed to represent them correctly.

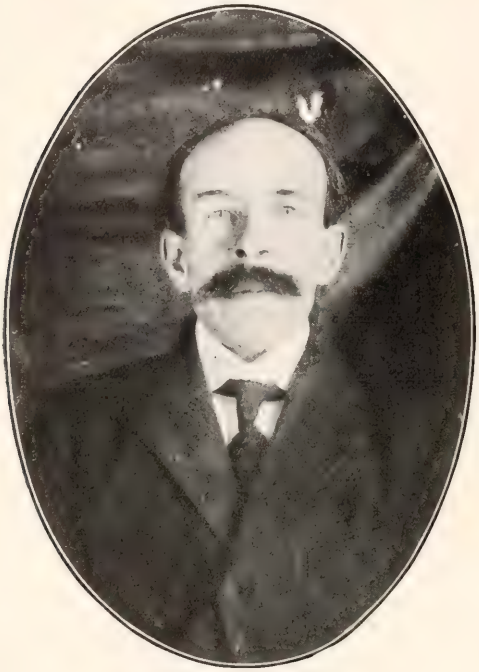
The thought occurred frequently, "Oh! if there were only some way to photograph them so that others might see and enjoy their loveliness, even as I do when viewing them under the microscope."

The popularization of dry plate photography seemed to offer me my chance. In the autumn of 1884, I purchased a Bausch & Lomb microscope with one-half inch objective and an extension camera and by uniting them made what is called a photo-microscopic camera. In this apparatus, the microscope objective takes the place of the ordinary camera lens and makes a greatly enlarged image of an object for photographic purposes.

With what hopes and fears I made my first attempt, using window frost for my subject and artificial (oil) light for illumination!

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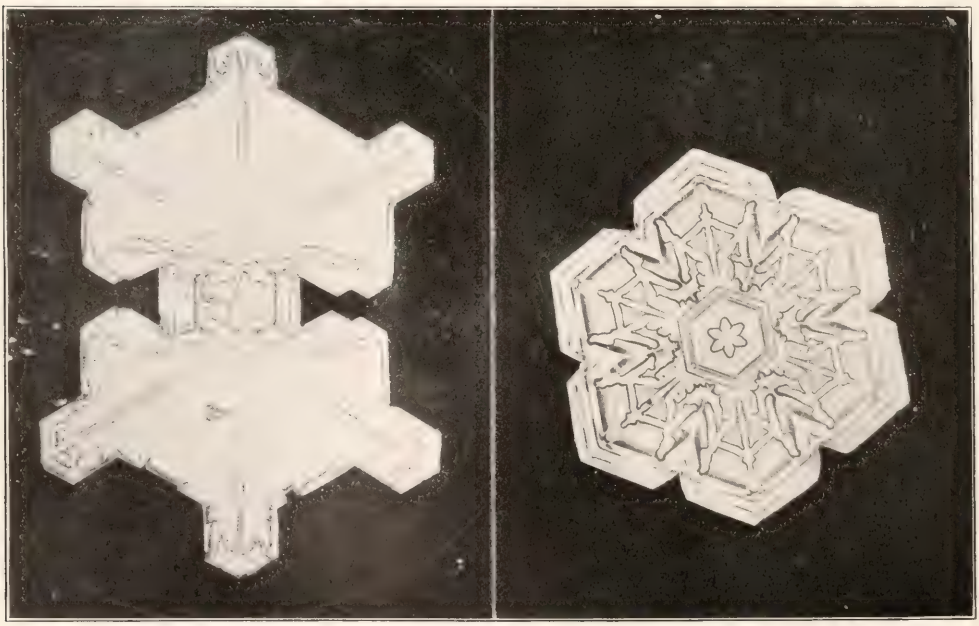
And was there ever disappointment so keen as mine when I found that the



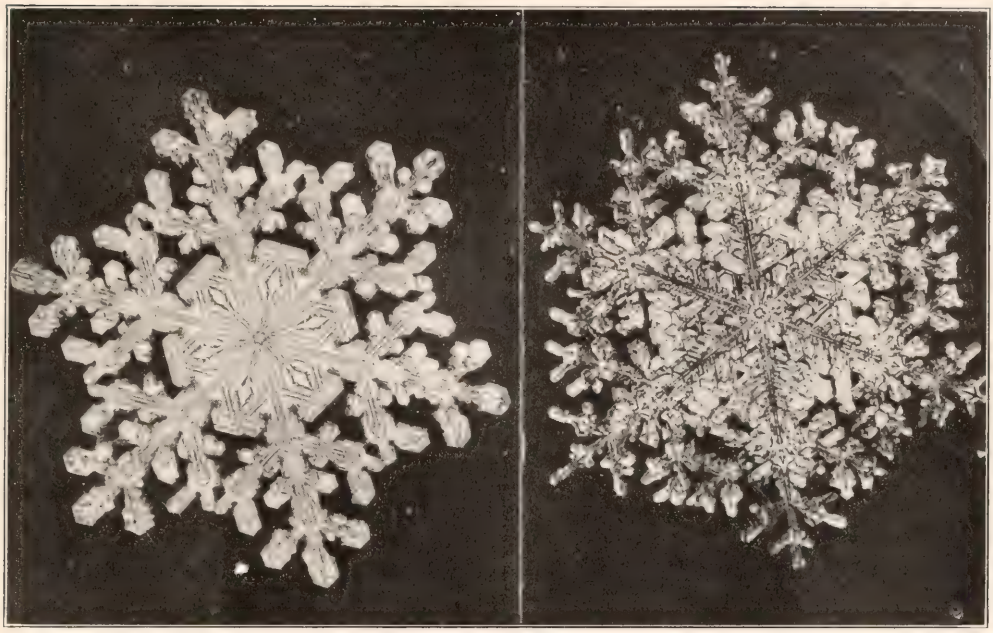
WILSON A. BENTLEY.

frost would melt far too quickly for photographic work, even in a temperature far below zero. It became clear that new and untried methods must be employed in this delicate work. I tried ordinary daylight for illumination but failure again resulted as too much light (too large a stop) was used to light the object, thus drowning out detail and contrasts. Our efforts seemed to spell failure. Finally, noting how much sharper and plainer delicate transparent crystals of alum, etc., appeared when but dimly lighted (using a small stop), we made a very small stop, one-sixteenth of an inch, for our microscope sub stage and applied this principle to our work.

The first trial demonstrated the success of the method, with ordinary daylight from snow or sky for illumination. There could hardly be pleasure more keen than was ours when success was at last assured. Now we could photograph with ease even the most complex and beautiful specimens of snow that the clouds might shower down to us, those that no artist, however skillful, could hope to draw. Now we felt that others would ere long share with us the delights of our beautiful study.



CURIOUS, MAT-LIKE FORMS OF SNOW CRYSTALS.



INTRICATE DESIGNS OF FEATHERY FORM.

We soon learned by experience the best method to pursue and to select the more beautiful and interesting specimens from among less desirable ones. The crystals were caught upon a blackboard and removed to a glass slide by a splint, examined under a microscope and rejected or, if of interest, pressed down flat upon the slide with a feather, the slide with the crystal placed upon the stage of the microscope, centered, focussed and photographed. Exposures varied from fifteen to one hundred or more seconds, according to the condition of the light and the extension of the camera bellows.

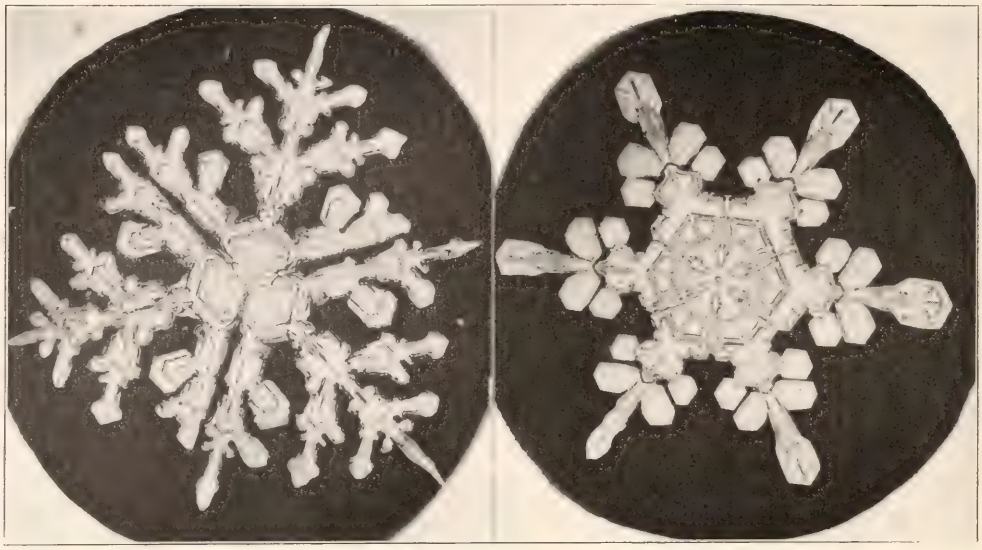
It was found necessary to handle all the apparatus with mittened hands and to hold the breath while observing the crystals, for the slightest breath destroys them. Our camera was placed in a cold room, which was always kept cold, and so placed that the objective pointed toward a window. The room was never darkened; all work, even exposing the plate, was done in the light.

The snows of each succeeding storm were eagerly searched for interesting specimens. How absorbing the work was! Whenever favorable storms came, the pangs of hunger, the grip of the cold, work, pleasure, everything but the labor in hand was forgotten or neglected. We were for the time being in crystal land, in a wonderful and but little explored realm of nature, finding therein gems of matchless beauty.

From this time onward each succeeding winter has found us on the watch for favorable snow falls and delving among their crystal treasures for new and unique forms to add to the collection, and every favorable snowfall brings much that is new to interest and delight, and to augment our photographic treasures. The certainty of always finding new forms as each storm comes endows our study at all times with the charm of novelty and adds immeasurably to the fascination of our beautiful study.

How fascinating is the work may be inferred from the fact that we have never yet found a time during all these twenty-four years when we could entertain the idea of relinquishing it. One who pursues snow study is near to the infinite in nature, infinite numbers and infinite variety.

One is always hoping and expecting that each coming snow fall will



STUDIES IN CURIOUS FORMATION OF ARMS AND CENTERS.

furnish crystals of surpassing and undreamed of beauty far in excess of anything previously found. This hope is reasonable for we may be certain that no one has yet found the one or the few masterpieces that each storm affords.

As the winters came, new problems unfolded and pressed for solution. Moreover, our studies broadened as time passed and the realms of frost and ice were in turn entered with notebook and camera. These, too, proved to be full of interest and beauty and of problems unsolved.

We eventually entered into a photographic and comprehensive study of the various forms of water at hand, the snow, frost, ice, dew, clouds, hail, in an endeavor to solve some of the mysteries that enshroud their life history and general relation. We wished most of all to secure photographic likenesses of every type of these several forms of water and of water crystals.

We have now a collection of fifteen hundred photo-micrographs of snow crystals, no two alike; three hundred and fifty of frost and window ice; more than two hundred of ice crystals and many of dew, clouds, hail and ice columns.

Our collection of photographs of snow crystals is doubtless the largest and most beautiful on earth and it is doubtful if other collections of frost and ice equal or excel ours. Our studies, observations and photographs have helped to reveal several facts and to solve some problems regarding snow, frost and ice architecture and their habits of growth.

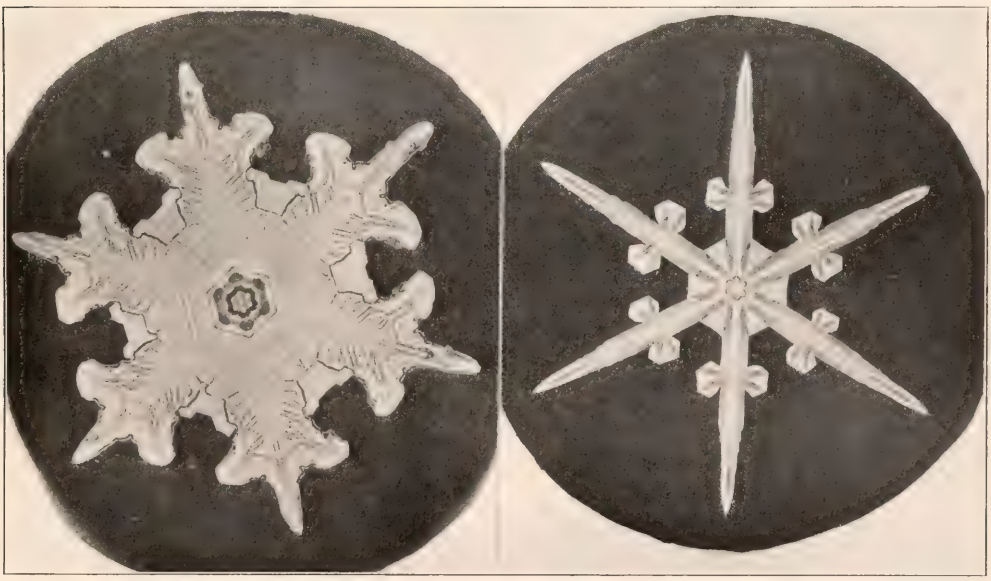
Our data tend to confirm many of the observations of others and perhaps also to disprove some. The snow crystal photographs have served to reveal a degree of beauty and symmetry in the snow crystals hitherto thought impossible and to demonstrate their all but infinite diversity of form and structure.

Our photographic collections of snow, frost and ice are now comprehensive and serve to picture with some fullness the many types of each though not,of course, their individual variety of form and structure.

Among the more important facts and theories that our studies have served to confirm or to render probable are the following: The clouds and the liquid water-dust of which they are composed do not make true crystalline varieties of snow crystals nor form the bulk of the snow fall. Cloud particles coalesce only into amorphous form, to produce granular snow or granular

coatings to the true crystals. The bulk of the snow fall, consisting of true transparent snow crystals, is formed directly from the invisible water vapor (individual water molecules) in solution within the atmosphere and floating about among the clouds, as well as below and above them. In general the western quadrants only of widespread storms furnish large quantities of perfect and beautiful tabular snow crystals suitable for photographic purposes. As a rule, the several cloud strata, the low, intermediate and high, tend to produce certain characteristic types peculiar to themselves. The arrangement of the air tubes and the shading within the crystals,outlining various geometrical forms, one outside the other, shows more or less perfectly the varied shapes that the crystals assumed as development proceeded from the center outward. Snow crystals, differing but little or not at all from those falling from storm clouds, sometimes form (though in small quantity) and fall to earth from clear, cloud-free air. Many types of snow have their counterparts among frost and ice crystals. Many of the irregularities of form so characteristic of the crystals falling during thick and heavy snow storms are due to crowding; i. e., to the close proximity of two or more crystals while in the process of development. Crystals that develop rapidly tend to form in an open and arborescent manner; those that develop slowly become close and solid.

Public recognition of my work came slowly. No illustrated or other kind of articles treating of snow crystals appeared until the "Popular Science monthly" published an illustrated article about them in 1898, twelve years after the beginning of our studies and photographic work. Many illustrated articles treating of them have appeared since then, both here and abroad. These, and especially the writer's "Studies of Snow Crystals during the Winter of 1901-1902," one hundred and fifty illustrations, published by the Weather Bureau have served to attract world wide attention and admiration. Recently the Weather Bureau has published "Studies of Frost and Ice Crystals," one hundred and seventy-five illustrations, and the writer hopes this latter article, together with this little sketch of our study, will help to call renewed attention to the wonders and the beauties of the crystals of frost, ice and snow.



SPECIMENS SHOWING "DAINTY" FINE LINES.

HOW DID THIS WOODCHUCK BITE?

BY MISS W. C. KNOWLES, WASHINGTON, CONNECTICUT.

If a certain woodchuck that lived in my neighborhood could have seen his shadow on Candlemas Day, I am sure



THE WOODCHUCK'S MOUTH THAT NEEDED A DENTIST.

that he would have been so badly frightened at his own profile he would have made good the proverb and forever after dodged the hunter and his gun.

This particular ground hog, when last seen nibbling juicy roots in the pasture, looked as if he had grown tusks. In fact two of his incisor teeth had continued to grow so long that one of them had curved around like a big horn and actually pierced his upper jaw.

This woodchuck with the queer incisors, when captured, was in a fair condition and showed that he must have learned to make good use of his molars for closer examination proved that neither one of his queer horned teeth had anything to bite against, some accident having happened to the opposite tooth in both the upper and under jaw. This fact plainly showed that a woodchuck's incisor teeth have a tendency to grow long and like the rabbit's and the squirrel's throughout life must be kept their proper length by constant gnawing of the roots, seeds and hard substances upon which they feed.

Since the wood chuck's incisors are softer than the human teeth and so wear off by constant use, one would naturally suppose that they would look like stubs or pegs and be of little service to the animal; but any country boy can testify that the ground hog's teeth are keen and sharp and that he can put up a good fight with a dog if he is cornered between the wood lot and his burrow.

Now if you will examine a woodchuck's broken incisor tooth you will soon discover the secret of his sharp bite. The front of the long tooth is covered with a very hard enamel while the back of the tooth is protected by the thinnest possible covering. Of course, the hard enamel at the front is more resisting and as the animal gnaws his tooth wears away from the back side and the hard enamel at the front continues to form a sharp cutting edge.

Nature exacts more than passing admiration; she would have worship. To this end she importunes, with persistence and unremitting patience besieges us, and undertakes with every crude semblance of a man the culture of that germ of true life—the perception of the Beautiful.—"Where Dwell's the Soul Serene," by Stanton Kirkham Davis.

ON THE HEIGHTS.

BY EMMA PEIRCE, NEW YORK CITY.

On the heights come nobler thoughts,
 On the heights less petty views;
They broaden our horizon line,
 And lead us worthier things to choose.

Where nature spreads so boundlessly,
 One cannot narrowness retain;
This reaching toward Infinity
 Must be to all a lasting gain.

Then often let us seek the heights,
 These clearer outlines to define;
And, widening thus our earthly ken,
 Make broad the soul's horizon line.

AN ILLUSTRATED SNAKE STORY.

BY WILBUR F. SMITH, SOUTH NORWALK, CONNECTICUT.

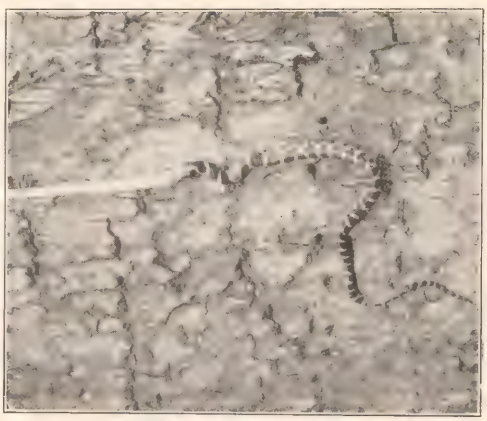
Nearly every one who has passed his life in the country can tell a good "snake story," but if you will gather such stories from widely separated sections, you will find them presenting a surprising similarity; as, for instance, the "great snake which lived in Uncle David's hill pasture," terrifying the cattle and folk alike, and was "so big it must have escaped from some circus," the "racer" which chased the berry pickers out of the fields; the milk snake which was confidently said to have climbed up and milked the cows when the cows had not given the usual amount of milk; the adder which had so charmed the toddling child at the doorstep that the child was snatched away just in time to save his life, and a wonderful variety of others devoutly believed by those who tell them because a snake was seen under such circumstances that the mind, influenced by the inherent fear of all snakes and by the highly colored and impossible stories told of them, had been unable to interpret aright what had transpired. And so snake stories have become a synonym of a badly stretched or magnified truth not to be taken seriously.

If we can cast aside our prejudice and learn to distinguish the poisonous from the harmless varieties, knowing that nothing in nature is unlovely, we will find much of interest and wonder in these feared and despised creatures and have stories to tell that will rival the fantastic tales with which we are familiar, as evidenced by what I saw one balmy September day when crossing a sphagnum meadow. I was attracted by a commotion on a neighboring bog where I found a milk snake swallowing a common streaked snake. It was the latter's struggle to escape that attracted me. Unfortunately I did not see the beginning for the milk snake already had the victim's head in his mouth and a firm grip around the body, but I watched them closely to see how the trick was done.

It was clever work on the part of the milk snake and a terrible struggle on the part of the other which caused them to thrash around on their battle field, but the odds were too much against the striped snake and as his body disappeared down the captor's throat his struggles became weaker. When the victim was half swallowed I carried them both in my camera case to the orchard near by where I photographed them. The position of both snakes is plainly shown in the accompanying photograph.

To accomplish its purpose the milk snake had wound its body around its victim some four inches back from the head with a grip that could not be loosened and thus was able to keep that part of the body "slack" and incapable of resistance. At the right moment it would let go and quicker than the eye could follow would get a new and lowerhold that kept the streaked snake powerless.

My interference proved fatal to the completion of the milk snake's meal for he suddenly disgorged and both snakes tried to get away. On catching them I found that there was a difference in their lengths of only one and one-half inches in favor of the milk snake.



MILK SNAKE SWALLOWING GARTER SNAKE.

One authority on reptiles to whom I sent a copy of the picture tells me that such conduct on the part of snakes is more common than most persons believe yet is seldom seen

and for this reason the photograph is both interesting and valuable. I offer it to the readers of THE GUIDE TO NATURE because it seems too good to be locked in one's notebook and because it is a "snake story" that with the picture attached does not have to be proved to be believed.

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MAPLE SUGAR BOILING IN COLONIAL TIMES.

BY REVEREND L. S. NICKERSON, SUGAR HILL, NEW HAMPSHIRE.

There are now no scenes in this vicinity of sugar making like that shown in the photograph. It belongs to a generation wholly passed away. This photograph was taken about twenty-five years ago and was then the last of the kind possible, for it was the last and only boiling of this kind in this region.



"BOILING DOWN" THE SAP.

In the autumn when the leaves of the maple ripen they store up in the limbs and trunks a large amount of sugar; other trees store up pitch or starch. When the thawing and freezing of early spring come or in a warm spell in midwinter, the sap of the tree, carrying this stored up sugar, begins



AN ANTIQUATED SUGAR CAMP.
See Frontispiece.

to circulate up and down the trunk and branches. There is on an average about one pound of sugar to a sixteen quart pail of sap.

evaporating pans set in brick and all enclosed in a comfortable sugar house is quite a different thing from this way of our grandfathers.



AN ANTIQUATED METHOD OF "BOILING DOWN."

This sap was brought from the trees to the boiling place in large, heavy, wooden pails carried across the shoulders by a fitted board (called a neck yoke) with string and hooks at the ends.

The first settlers made a gash in the trees with an axe and drove in a sharpened chip which led the sap out from the tree a few inches where it dropped into a little trough made out of one-half of a two and a half foot cut of a pine log. In this way much of the sap was wasted. After a time they made spiles out of the branches of the sumach by burning out the pith with a hot wire. These they fitted and drove into small auger holes. Instead of the troughs they used pine and cedar buckets that would hold about twelve quarts of sap.

The manner of evaporating the sap can be readily understood by studying the picture.

The season of sugar making usually comes the last of March or the first of April and lasts from one to three weeks.

The modern methods of gathering the sap and evaporating it in large

THE VERNAL MOMENT.

THOMAS BAILEY ALDRICH.

When the first crocus thrusts its point of gold
Up through the still snow-drifted garden mould,
And folded green things in dim woods unclose
Their crinkled spears, a sudden tremor goes
Into my veins and makes me kith and kin
To every wild-born thing that thrills and blows.
Sitting beside this crumbling sea-coal fire,
Here in the city's ceaseless roar and din,
Far from the brambly paths I used to know,
Far from the rustling brooks that slip and shine
Where the Neponset alders take their glow,
I share the tremulous sense of bud and brier
And inarticulate ardors of the vine.

If a man loves the woods there is in him something of their sincerity and straightforwardness and if he love the mountains, he retains somewhat of their grandeur and simplicity; for, we ever seek in the world of form what best expresses the idea within us, and by our tastes and pursuits divulge what manner of man we are.—"Where Dwells the Soul Serene," by Stanton Kirkham Davis.

THE CAMERA

THE EFFECTS OF AN ICE STORM.

To turn nature into a glistening fairy land and to bend, break or gracefully curve the trees and shrubs are the especial effects of an "ice storm."

Among the trees none more gracefully take the decorations than do the white birches.

The following photographs by Mr. Milo Leon Norton show great scenic beauty but fail to show detail. What a wonderful photograph could have been obtained from the detail of a section of this wonderful scene.

Mr. Norton took a series of several photographs and all are good, though we show only the two following. But, to my mind, a series showing the details with varying length of bellows would have been better. Most of us nature students wander around too much. We try to compass all. It would be far better to carefully study a small portion more in detail. What a wonderful photograph could have been obtained here with a square yard of black cloth for background and a long focus camera.



BOWED DOWN WITH THE WEIGHT OF GRACE AND BEAUTY.



COULD THERE BE ANYTHING MORE ENTRANCING THAN THIS?

PHOTOGRAPHING LIGHTNING.

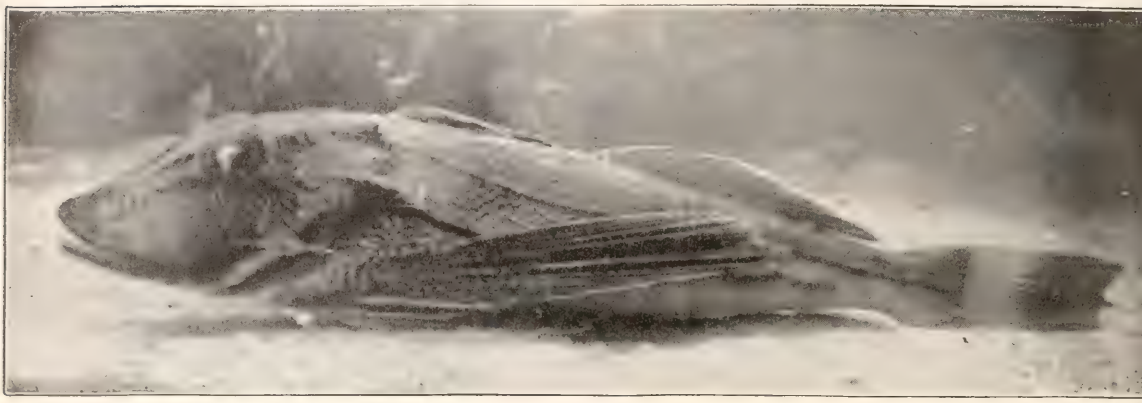
BY REVEREND L. S. NICKERSON, SUGAR HILL, NEW HAMPSHIRE.

I enclose two lightning photographs. They were taken about eight o'clock on the evening of August 6th, 1907. The conditions were most favorable. The thunderstorm was ten or fifteen miles to the north of me and for an hour or more continued in a favorable



THE TWO PHOTOGRAPHS OF LIGHTNING.

position for photographing. Where I stood there was no rain at any time that evening. You will take note that one of the flashes is as though it was a cord of three strands of which one is black. I have no explanation of this and have never seen any suggested.



AN UNDER THE WATER PHOTOGRAPH.
A sea robin by Dr. Shufeldt.



A LITTLE FROLIC AMONG COCOANUT TREES.
Photograph by J. R. Campbell.

POPULAR ASTRONOMY.

THE HEAVENS IN MARCH.

BY GARRETT P. SERVISS, BROOKLYN, N. Y.

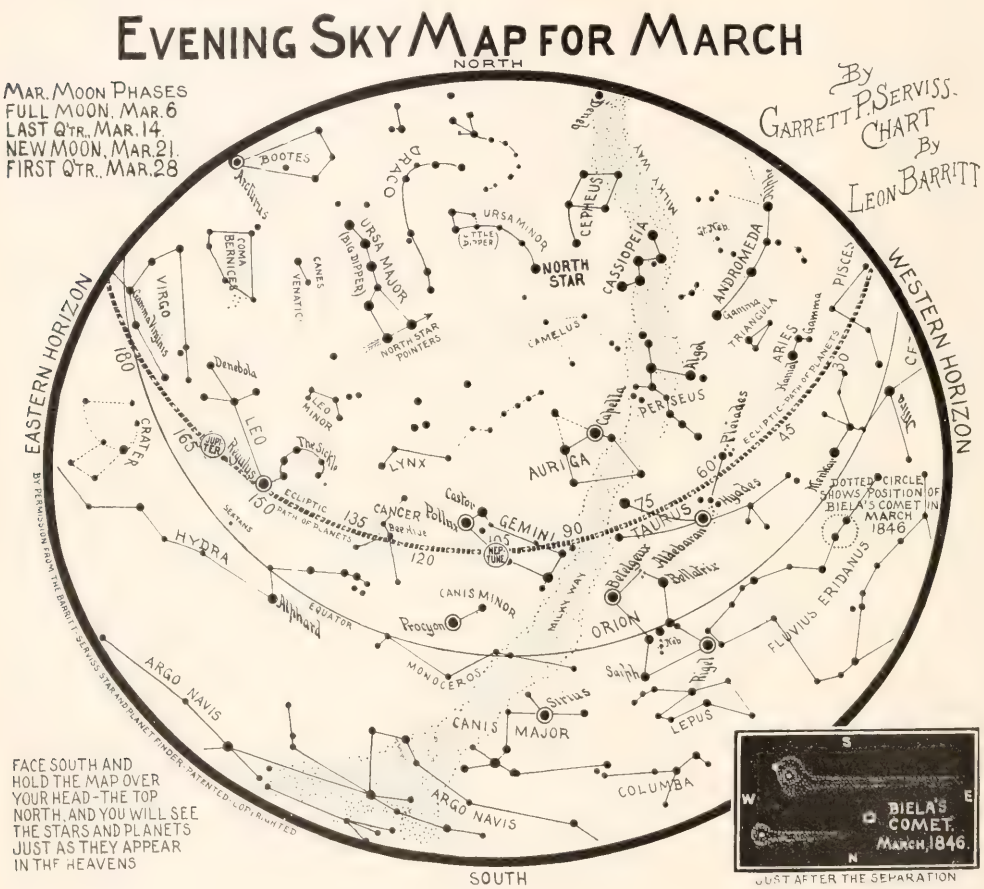
The chart, as usual, represents the appearance of the heavens at 9 P. M. on the first of the month, 8 P. M. on the 15th, and 7 P. M. on the 31st.

This month Jupiter holds practically sole possession of the evening sky. Saturn, it is true, may be seen very early in the evening, low in the west, but he is too near the sun for satisfactory observation. All the other planets, with the exception of Neptune, in Gemini, are morning stars. Neptune is only visible, under any circumstances, with a telescope. Thus Jupiter reigns without a rival. Having passed the point of opposition to the sun at the end of February, Jupiter is now in the best position for observation, and can be seen during the whole night. On the first of the month he rises about 6 P. M. and sets about 6 A. M. Those who have telescopes will find unceasing pleasure in watching his great colored belts and his four principal moons, whose motions are sufficiently rapid to be remarked in the course of a few hours. The eclipses of these moons by Jupiter's shadow, and the transits of their own shadows across the face of the great planet, like round dots of ink, are among the most interesting phenomena that small telescopes reveal. It is now known that Jupiter has no less than eight moons, there being four very minute ones in addition to the four large ones which have been known since the time of Galileo. The first of the four little moons was discovered by Prof. E. E. Barnard in 1892, and the last just a year ago at Greenwich. The latter has recently been photographed at Greenwich, and all doubt as to its being a true satellite of Jupiter has been set at rest. It is a very extraordinary body, too small to be accurately measured with our means, and travelling in a very eccentric orbit, at an enormous distance from its master planet. This distance varies from ten to twenty million miles! Last August it was nearest to Jupiter; next September it will be at its greatest distance, its period of revolution being about two years and two months. Another extraordinary fact about this strange little satellite is that it revolves in a retrograde direction, that is to say, contrary to the direction pursued by all the other satellites of Jupiter. This peculiarity it shares with the most distant satellite of Saturn, which is also a recent discovery, Saturn now being known to have ten moons. The retrograde motion of these two bodies has been thought by some astronomers to indicate that they were originally asteroids which have been captured by the attraction of Jupiter in the one case and by Saturn in the other.

THE STARS AND CONSTELLATIONS.

The western half of the heavens is now the most brilliant. At the hours represented by the chart Orion is seen far west of the meridian with Capella over his head, Taurus above him toward the northwest, and Sirius following him in the south. Procyon in Canis Minor, and the Twins in Gemini, are seen a little west of the meridian. The Milky Way seems to rise from the middle of the southern horizon, passing through Argo Navis, then between Sirius and Procyon, between Orion and Gemini, between Taurus and Capella, through Perseus and Cassiopeia, the latter being now low down in the northwest, and finally dipping behind the northern horizon, almost under the Pole Star. The Great

Dipper is well up above the pole in the northeast, and near the horizon in the direction indicated by the Dipper's handle is seen Arcturus in Boötes, just rising. On the ecliptic, in the eastern half of the sky, shines Regulus in the heart of Leo. Southwest of Leo, in a relatively barren part



of the heavens, is seen the lone star Alphard in long constellation Hydra. Between Gemini and Leo glitters the cluster called the Manger in the constellation Cancer. Among double stars now well placed for observation with telescopes may be mentioned Castor in Gemini, whose two stars are six seconds apart, and easily seen with a small telescope, and Gamma in Leo, the second star above Regulus in the Sickle. In this case the two stars are

less than four seconds apart, and they present contrasted colors, the larger being yellow and the smaller greenish.

In accordance with our intention to present each month the story of some remarkable comet, on account of the interest in such bodies aroused by the impending return of the great comet of Halley, the chart shows the position occupied in March, 1846, by the strange comet of Biela, which in the preceding January had split in two. The story of Biela's Comet is one of the most extraordinary known in astronomy. It was first seen in 1826. It reappeared in 1832, its period of revolution being about six years and nine months. It was due again in 1839, but owing to its unfavorable position in the sky at that time was

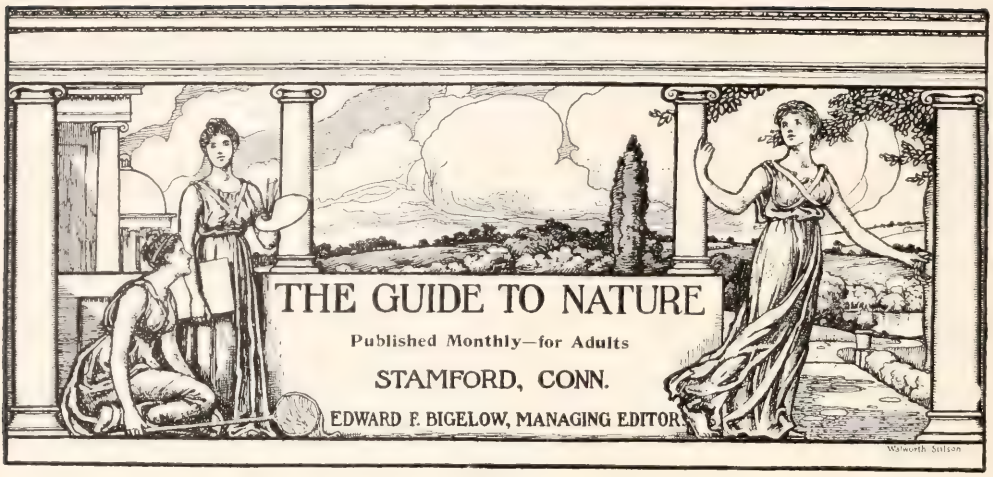
not observed. Its next appearance was at the end of November, 1845. It was observed during the winter, and on January 13, 1846, it was noticed at Washington that the comet had become double. At first the part that seemed to have been thrown off was comparatively faint, but gradually it brightened, until in February it had become as bright as the original mass from which it had separated. Most wonderful of all, there was sometimes visible a faint misty band connecting the two comets, although their distance apart was more than 200,000 miles. And this band or bridge, occasionally oscillated, swinging one way and then the other, as if the two comets had been attached to the ends of a rigid bar which was swung slightly to and fro. Each of the comets developed a tail of its own. In 1852 back came the twin comets, one becoming visible nearly three weeks before the other was seen. By this time they had got much farther apart,their distance from one another being now no less than a million and a half miles. Both passed round the sun and they disappeared in September. At the times when they should have been seen when due again in 1859 and 1866 no glimpse of them was caught, but in 1872, when again due, instead of the comets a brilliant shower of meteors, believed to be travelling in their track burst over the earth, radiating from near the star Gamma in Andromeda. It is generally believed that the original comet of Biela has been entirely disintegraded into meteors, principally by the action of the sun. These meteors were seen again in 1892. The same fate is supposed to await all comets that travel regularly round the sun. It may be one reason why all the periodical comets which come back every few years are relatively inconspicuous; each time that they venture near the sun forces act upon them tending to their disintegration, and thus after many returns but a remnant of the original comet is left. All of the great meteor showers are known to be travelling in the tracks of comets, and in some cases the comets from which they have originated have not entirely disappeared, but come back also at regular intervals. Recently Mr. Denning, the well-known English student of meteors, has pointed out that there seems to be a small meteor swarm following Halley's Comet in its orbit, indicating that that comet, too, is slowly going to pieces. The form of Halley's Comet, and the extent of its tail have varied surprisingly every time it has reappeared, and astronomers are very curious to see how it will look on the present return. With its long period, about 76 years, it has resisted longer the forces of disintegration that have almost dissipated some of its compeers which come back every six or seven years. There are no great meteor showers in the month of March, but five minor showers are known, two of which may be seen in the evening. The first of these occurs during the nights from the 5th to the 10th, radiating from a point between the head of Taurus and Auriga. They are described as "slow and bright." The second shower occurs on the 20th, radiating from a point above Coma Berenices. Its meteors appear as "swift streaks." The observation of meteors is something especially suited to amateurs, requiring no instruments. All that is necessary in order to give value to the observations is to notice carefully the apparent track of the meteors among the stars, and their peculiarities of appearance. These observations become very fascinating as soon as the observer has convinced himself that the flight of the meteors is governed by laws as fixed as those that prescribe the motions of the planets in their orbits.

VIOLETS.

BY EMMA PEIRCE, NEW YORK CITY.

Violets blue look up at you
Through their grassy veils,
And far away as one can see,
Their azure beauty trails.

Blue of Heaven, blue of love,
They have their message sweet,
And breathe its dear significance
Right at our very feet.



PERSONAL.

The naturalist-philanthropist has supplied Arcadia, the editor supplies his time without money remuneration, members of his family aid in this work, eminent scientists and naturalists contribute articles and photographs, artists have contributed drawings, the price of subscription has been reduced, —in fact, much has been done by many gladly not only to produce an ideal magazine but to give it the widest possible circulation.

But there is still much, yes, even more to do. We must give the knowledge and love of nature the widest dissemination in best possible form. To that end you are cordially invited to co-operate.

No enterprise was ever more personal, ever freer from pecuniary motives and more in the love of a great cause than is The Agassiz Association and its magazine, THE GUIDE TO NATURE.

They will succeed, they shall achieve their ideals, because they are worthy.

GUIDANCE NEEDED.

I am overwhelmed with work that must be done for Arcadia. Much of this has been the outcome of suggestions or requests from persons of all ages who are interested in the project. "I do hope you will work out this and the other and tell us about it." Such has been the substance of many welcome letters. Suggestions are desired; requests are welcome. All show real interest. If Arcadia is to be successful, means must be provided for doing the work. It is astonishing how much there is in nature, even in "commonplace nature," on which many persons seek guidance.

FEED AND CARE FOR THE "ELEPHANT."

Next month we shall be settled in Arcadia, as described in the January issue of THE GUIDE TO NATURE.

Perhaps the situation will be made more impressive by a comparison. We have had led to us a huge elephant or, more literally, we have been led to the "elephant" which is capable, if properly fed and cared for, of doing a tremendous amount of work in a great and good cause. But the food, the care and the money to obtain these, have not been supplied. Must the elephant therefore stand idle or shall he be set to work?

Feed the elephant! Only a small contribution from every one interested will provide an ample supply of nour-

ishment. Have you forgotten your Latin? Try your skill on this; "*Bis dat qui cito dat.*"

This is not an editorial "we" but a "we" which includes hundreds of students and lovers of nature. You are one of them. Arcadia is for you.

"SUCCESS!"

This number completes Volume I of THE GUIDE TO NATURE. The twelve months have been successful—much more successful in many respects than was anticipated. The Prospectus and the first numbers of THE GUIDE TO NATURE were issued amid some discouragement and misunderstanding. The entire volume has been edited with very restricted facilities.

But many friends have given hearty co-operation and encouragement. Chief among these friends is the philanthropist-naturalist who supplies Arcadia into which we shall move next month.

The light is brightening; the outlook is becoming more and more favorable. We are going on to greater things in our love and study of nature.

Beginning with our next volume several improvements will be made in THE GUIDE TO NATURE. The cover designs will be in entirely different style; some departments will be changed and several new features introduced. Our old and faithful friends, and the new ones that are rushing in with commendable and inspiring enthusiasm are making all this possible.

The banner "*success*" will be greatly advanced during the coming year. Join our happy, enthusiastic company.

Life is worth living, and that, too, in all intensity and zeal. Whatever may be coming, one fact is sure. We shall not pass through this paradise again. Let us gather all we can as we go. Make a real "success" of it. "Life is a series of pictures and they come our way but once."

"The Guide to Nature" seems to me particularly worth while because of the excellent reproduction of the photographs. With the large membership of the AA I hope you will be able to keep the good work going.—Richard C. McGregor.

DEATH OF HENRY BAUSCH.

Just as we are going to press, there comes to us the sad news of the death of Henry Bausch (of the well known firm of The Bausch & Lomb Optical Company). Mr. Bausch died at Augusta, Georgia, after a long and painful illness, where he had gone on account of ill health. His age was fifty years lacking one week. Mr. Bausch has accomplished much in the advancement of natural science and every nature student will be saddened to learn of the death of so faithful a worker.

DOMESTIC QUAIL.

A special license to keep quail and partridge (ruffed grouse) for experimental purposes having been granted to Arcadia by the State of Connecticut, I desire to purchase specimens and to obtain information on the subject. I expect to conduct a series of extensive experiments and desire to learn what has already been done by others. I also want records of observations of wild quail and partridge. Any information pertaining to these birds that may be sent to me will be much appreciated.

DON'T BE AFRAID TO BE EGOISTIC.

There is a vast difference between egotism and egoism. We do not seek for personal boasting or for self-laudation, but we do want personality. We want not merely the object but your relation to it, and what it has meant to you.

Truly said Thoreau:

"If it were required to know the position of the fruit dots or the character of the indusium, nothing could be easier than to ascertain it; but if it is required that you be affected by ferns, that they amount to anything, signify anything, to you, that they be another sacred scripture and revelation to you, helping to redeem your life, this end is not so easily accomplished."

Therefore do not be afraid to use the first personal pronoun. You will then be more concrete than in the abstract third person.

This magazine is "a medium of in-

terchange of observations for all students and lovers of nature." We want not merely the thing but we want you with it.

A scientist went to Woods Hole biological laboratory for the further study of earthworms, his specialty for years. He expected to meet specialists with an extensive knowledge of earthworms and thereby be benefitted. He met, however, a man who had thoroughly studied dogfish and knew almost nothing of earthworms. As good luck would have it, the two students became chums, and each benefitted by the other's enthusiasm. Inspiration is always worth more than facts.

And most of our inspiration is: "omne vivum ex vivo," which means that we are inspired by the other fellow.

Spontaneous generation is not a present day theory, but fire may still be produced by striking flints. We want to know what others are doing, and even if not along the reader's immediate line, the inspiration will be catching,—the spark will be seen.

SNOW AND FROST.

Have you studied the snowflakes and the frost forms during the past winter? If you have, you can appreciate the joy and enthusiasm of Mr. Wilson A. Bentley whose article with its beautiful illustrations begins this number of THE GUIDE TO NATURE.

The snowflakes and the frost forms which you failed to see will never come again. Nature never repeats. We should read this lesson of the disappearing snowflakes and frost forms and profit by it.

But other beautiful and interesting things are drawing near. Do not lose them.

"The frost is coming out of the ground," the farmer and the nature rambler tell us as their feet crush the filamentous ice beneath decaying leaves and pulverize those frost-formed stalagmites that rise below the loose earth.

"But what matters that?" you inquire.

Really not much, indeed, unless it gets a little of the frostiness out of you. Thaw out! The naturalists' New



"THE FROST IS COMING OUT OF THE GROUND."

Year, April 1st, is almost here. Be ready so as to lose nothing.

THERE WILL BE OTHER ARCADIAS.

Next month the unique Arcadia, the Nature Institution as described in the January number of THE GUIDE TO NATURE, will be the headquarters of The Agassiz Association and of its allied interests. This will be the "home office," the center of thought, and we hope the inspiration, or whatever you see fit to call it, of hundreds of other Arcadias, branch-Arcadias, Sub-Arcadias, all sorts of Arcadias, and the Mecca toward which their friends will journey for aid.

This central Arcadia will lead; the others will follow, disseminate, co-operate by a variety of methods in a variety of places.

We hope and intend that an important work of this central Arcadia shall be to tell of the others, to assist in their formation, to answer questions, to be parent, friend, to many other and similar Arcadias. Several friends have called attention to the fact that "the name Arcadia is good but trite."

The name is trite and commonplace, but expressive. Therefore it is exactly right. Everybody knows what it means and everybody is urged and will be aided to make practical application of that meaning. We hold nothing exclusive; we disseminate in "commonplace nature with uncommon interest." We shall be happy only when we are scattering abroad and broadcast.

To the central Arcadia send your notion of an ideal Arcadia. This is an Arcadian year. All hail Arcadia—yours and ours; for ours shall be yours!



IN CAMP NEAR SUMMIT, PLACER COUNTY, CALIFORNIA.
"This is my idea of Arcadia."—E. B. Beecher, Auburn, California.

HIT SOMETHING.

When I was a young boy large flocks of passenger pigeons were still in existence. I was fond of hunting them and as a result many a pigeon pie decorated the dinner table to my pride and great gustatory satisfaction. Every time I started out on such a hunting trip, my invalid grandfather told me the same story, an experience of his boyhood, at which he always laughed heartily, as I was expected to do, although I felt at the time that the story had been so often repeated that all its original humor had vanished. But in later life I realized that it was not all a joke. From the lesson it conveyed I have since reaped much benefit.

The story was as follows:

"When I was a boy, no older than you, I went hunting pigeons as you do, but with the old flintlock now in that corner by the bureau. The flocks of pigeons were larger in those days than now. It would take a long time for a flock to pass overhead, and there were often so many as to darken the landscape like a cloud. One of the smaller flocks alighted in the oak by the pasture spring. I say 'smaller' but there were enough to fill the tree so you couldn't see anything but pigeons. I thought what a large number I would kill. I felt as if I wanted to shake the aim over the whole tree and kill the whole lot. I didn't take much aim; I just pointed that way and fired. I thought the charge couldn't go amiss. Every pigeon flew and I stood and watched them. I—didn't—get—even—a—f—e—a—t—h—e—r!"

Here my grandfather would laugh heartily and, "Then," he continued, "I went on till I saw three pigeons go overhead and alight on a dead branch of an old scrag apple tree. I tiptoed around slowly till I got all three—in—line. Then I took careful aim and fired. I—got—all—three—and—I—never—had—pigeons—that—tasted—better!"

Here he laughed harder than ever!

There are some of our students and some of our would-be contributors who should tiptoe carefully and get all three into line and then take careful aim!

Please try to hit something. Do not fire all over a ten mile walk and tell about the heavens above, the earth beneath and the waters under the earth—your emotions, your soliloquies, your aspirations. Please, Oh, please hit something.

A LABOR OF LOVE.

The February, 1909, issue of "The Mineral Collector" completes the fifteenth volume of that interesting, semi-technical magazine. Mr. A. C. Bates, a well known writer on mineralogy, tells, in his "Sundry Notes," of the work of Mr. Arthur Chamberlain who for fifteen years has conducted "The Mineral Collector" as a labor of love. Quite rightly Mr. Bates praises this indefatigable worker for the great task that he has accomplished and, in closing, says "Let us stand and drink a silent toast to Mr. Arthur Chamberlain." I intend to drink the toast but not to make it a silent one. Such faithful work as Mr. Chamberlain has for fifteen years been doing for that magazine now discontinued and on the previous "Exchanger's Monthly" and the "Mineralogist's Monthly" deserves our highest commendation. And that he already has. Nothing that THE GUIDE TO NATURE can say will add to the estimation in which he is held by his clientele. His work has been not a means to an end but an end in itself. Undoubtedly he will value the praise that has been showered upon him by his subscribers but this, however sincere and enthusiastic, cannot be an adequate reward for his labors. The work in itself has been worth doing but to that he has added pleasure by utilizing his evenings and holidays in setting the type and making up the pages of the magazine, a combination that can be realized and appreciated only by those who are likewise engaged in some missionary work for the advancement of the study and the love of nature.

THE GUIDE TO NATURE, in the number closing the first volume, makes to Mr. Chamberlain a bow of sincere appreciation. Both magazines, his and ours, are edited by love which Drummond, as quoted by Bates, calls the greatest thing in the world.

I have not had the pleasure of an extended personal acquaintance with Mr. Chamberlain but from what I have seen of him I agree with the writer who calls him "a bundle of American energy." He has been a collector of minerals from boyhood and always willing and conscientious,—a combination which never fails to do something. "The Mineral Collector" has not been a large magazine. It has never boasted of having more than a million subscribers and the paper has not always been good nor the press work the best, but the beauty of the life that has animated the magazine has made every reader close his eyes to

defects so trifling. Affection beautifies everything to him who sees even the so-called ugly things of nature with the eye of love. "We love things not because they are beautiful but they are beautiful to us because we love them."

But one wonders why such a condition of the human mind should exist as to make such a labor of love necessary. Why has it not been the better appreciated by humanity in general? Why should one go to a news counter and find displayed, with all the excellency that liberal patronage can produce, magazines that are devoted to trash, while "The Mineral Collector" has for fifteen years struggled on, humanity not giving anything to the editor to pay him for his paper and press work? It does seem that the very rocks should their silence break and cry out for better appreciation.

"IT INTERESTS CHILDREN."

In the January number of THE GUIDE TO NATURE was published an interesting article regarding the dog "Owney" that traveled over a large part of the world with mail bags, being forwarded from place to place by the clerks and royally entertained by persons prominent in the government of cities, states and kingdoms. So far as we know the dog was always in association with adults.

We recently handed a copy of that number to a lady, suggesting that she would be interested in "Owney." She read the article and confessed that she was not at all interested in that nor in any other part of the magazine, but suggested that it might be "all right for children." Now what we want to know is, what is there about a dog that during his entire life was of intense interest to adults but which, as soon as he was dead, became, as this intelligent woman remarked, of interest only to children! We take this little incident as a text to say that it is a common remark and apparently a popular belief that nature study can be interesting only to children. A few months ago we published an article regarding rabbits. A local merchant who subscribes to THE GUIDE TO NATURE remarked to the editor that he supposed such things were of interest to children and had taken the magazine home to his little girl. The rabbits referred to were purchased from an adult breeder, a member of the American Fur Fanciers' Association, and the main purpose of publishing that article was to advance the interest among fanciers, everyone of whom, as far as I know, is a mature man or woman. Can it be possible that when we older ones ,who are interested in rabbits and cavies, write about them that the article and the photographs are regarded as intended solely for children? It must be so for when, in the early numbers of this magazine, we devoted an article to rabbits one of our adult readers took offence and withdrew his patronage because it was "too childish." Another, a scientist for whom we have great respect, bought a copy at a news stand and wrote to tell us that he regarded it as too juvenile. It seems that he desires to devote all his time to *Daphnia* and *Cyclops*.

Why is the study of the relation between *Daphnia* and *Cyclops* a proper pursuit for the adult while the study of a larger biological specimen in the form of a rabbit or a cavy is regarded as childish!

What is a child's interest and what an adults? We should like to have the subject discussed and we wish, too, that some one would explain why so many persons think an article pertaining to any phase of nature must necessarily be for children unless it bristles with gigantic words in a dead language. We have been endeavoring in THE GUIDE TO NATURE to interest adults because our work for boys and girls is limited to "St. Nicholas," but we must confess that when we publish an article on alligators by a learned physician and president of a large society of naturalists, when we publish an article on trees from the germination point of view hoping to advance the interest of forestry, when we publish an article on pet mice written by a noted physician who has devoted a life to that department of biology, when we publish an article on silkworms

and incidentally picture a child assisting a parent, when, in fact, we publish almost anything pertaining to plant or animal life, put it in a good readable shape, and do not pile up a list of long words and trouble our printer by a series of intricate bracketing, we should like to know what there is about it all that should be regarded only as so much matter for children.

Why is it that a teacher should write to us that she has no further use for THE GUIDE TO NATURE because she is no longer teaching, having left the profession to enter another or to get married; why is it that occasionally a person subscribes "for the children," why is it——. But it is not necessary to give further illustrations of the subject. Will some one please look at a tree, a dog, a rabbit, a book, a bird and tell us what there is in the subject that must restrict it to the sphere of childhood and what there is in it that does not or should not interest and instruct the adult? Please answer.

CORRESPONDENCE AND INFORMATION

THE HERMIT THRUSH.

Brooklyn, N. Y.

To THE EDITOR:—

You may like to hear again from Brooklyn's winter hermit thrush. On January 20th, I was rejoiced to see my old friend again in Prospect Park. Just at dusk he alighted on a bubbling drinking fountain, drank freely, and after a few shy glances to reassure himself, he plunged into the basin and took a thorough bath. After leisurely preening his feathers on a nearby shrub he flew to some pine trees and was lost to sight.

CAROLINE M. HARTWELL.

VERY FRIENDLY CHIPMUNKS.

Auburn, California.

To THE EDITOR:

In THE GUIDE TO NATURE for January appeared a very interesting article on chipmunks. While camping this last summer in the Sierra Nevada Mountains I became very well acquainted with the beautiful little creatures, and although they were a very great nuisance we would not have them driven away. They became very bold after a while, would even come up on the table while we were eating and run off with anything they could carry. One morning we had let the fire in our camp stove die almost out, so that the stove was only warm and while we were eating breakfast they came on to the stove, took potatoes out of the frying-pan, and scampered off with them.

I would sometimes tie a string around a piece of bacon and place the bacon at my feet, and they would catch hold of it, and I would lift them up into my lap, when they would let go and scamper off in a great hurry.

They got into our macaroni one day, and we afterwards let them have it, and it was amusing to see them take a piece in their paws, and sit up on their haunches, stow it away in their cheeks, then hurry home, put it away and hurry back for another load.

E. B. BEECHER.

SARCODES SANGUINEA.

Auburn, California.

To THE EDITOR:—

I wonder how many of your readers know the meaning of the above words, and how many of those who do know what it means have ever found it growing in its native home.

It was my good fortune to spend the summer of 1908 camping at the summit of Sierra Nevada Mountains. One day while wandering in the woods at the foot of Crow's Peak, my companion suddenly exclaimed "Oh! what is that?" in such a tone of mingled delight, surprise and admiration that I hastily turned to see what had called it forth, and there, on a slight rise of ground, perfectly free from underbrush, in the deep shade of the fir-trees with just a little sunlight struggling through the branches, was the most perfect specimen of the "snow plant" of the Sierra Nevadas, I had ever seen. It was about fourteen inches in height and one and three-quarters inches in diameter, and from a little distance seemed a solid mass of glowing crimson. On closer inspection it was seen to be covered with flowers the same color as the stem, and flowers tinged with a silvery, creamy tint difficult to describe, but the effect was very beautiful.

Do you or any of the readers know whether it has ever been propagated?

E. B. Beecher.

CARE OF PRIMROSES.

Franklin, Pa.

To The Editor:

Sarah Root Adams, who, in The Guide to Nature for February, asks for the best treatment for the primrose as a house plant, does not say which species of primrose she alludes to; but as the different kinds require nearly the same treatment, I will try to answer her question.

Primroses, with proper care, may be grown well in any ordinary soil; but will do best in a compost prepared as follows. Sods from a loamy pasture should be piled outdoors until the heap can be screened readily; when it should have about one third of its bulk added of real leaf mould, or thoroughly decayed manure from the yard of the cow stable.

This soil, when thoroughly mixed, will be found very satisfactory for growing all kinds of house plants; but would be improved by the addition of a small quantity of bone flour.

Primroses, and all other plants, should be placed where they can have an abundance of direct light; and also air from the outside, when the weather will permit. A temperature of from 50 to 60 degrees at night, and ten degrees higher during the day, will suit primroses very well; but the most important point in their treatment, as it is with all other plants, and the one that it is most difficult to explain, is the way in which they should be watered.

Water should not be given to any plant when the soil is saturated with moisture; but when the surface of the soil becomes light-colored and somewhat dry to the touch, the plant should have a sufficient amount of water given to it to wet all the soil contained in the pot; which will be enough until the surface becomes dry again. If in doubt as to whether the entire mass of soil has been moistened, the plant may be set into a vessel containing a sufficient amount of water to cover the top of the pot, and allowed to stand for a few minutes; when the water will penetrate the soil from above and below.

W. T. Bell.

IS THIS VERSION OF THE "DIPLOMACY" CORRECT?

29 City Hall Building,
Duluth, Minnesota.

To The Editor:—

Prof. W. owned a few chickens and desired more, and as a neighbor was moving away, Prof. W. purchased his hens. The man was also anxious to dispose of the rooster,—a lordly old fowl,—so the entire flock were moved to their new quarters. But the young roosters of Prof. W.'s flock resented the coming of their lordly rival, and a series of battles ensued; even an old hen with a brood of half-grown chicks was inclined to join in the attempt to rout the invader, and he was vanquished.

In the morning the young roosters escorted the hens to the feeding grounds, leaving the old cock in stately solitude. He spent most of the day in crowing defiance to the world in general, without attracting any notice. Next day he was again left alone, and it began to have a depressing effect.

He ceased to crow, and devoted himself to the task of winning back at least part of his lost harem. He would find a choice bit, and cluck and call and offer his treasure in the most persuasive manner, but all to no avail, and he "flocked all by himself" another day.

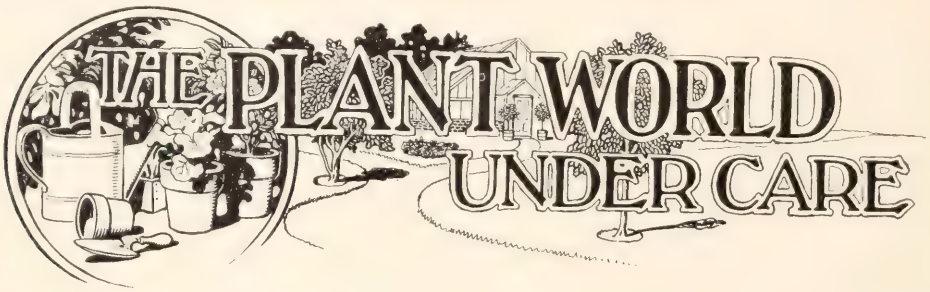
When night came Prof. W. noticed that he did not go to roost with the others, but crept into a box with the old hen and her brood, to assist in hovering the chicks. They were at a very uncomfortable age, but he stuck manfully to his self-appointed task, and half sitting, half standing, hovered the chicks.

Next morning he had one follower —his devotion had won the heart of the old mother hen, and she stayed by him all day; and thereafter first one and then another of the hens rallied around his standard.

Thus, when he found that martial glory was not for him, he "went in" for favor as a pattern of domestic virtue—and won.

Yours truly,

NELLIE B. PENDERGAST.



A PLEA FOR TAME PLANTS.

BY MISS W. C. KNOWLES, WASHINGTON, CONNECTICUT.

I had planned to give a rainy day nature talk to a party of friends on the piazza and for illustration had placed on the porch table material gathered in woods and fields and from a neighboring window garden. As I came behind the group who were examining my botanical bouquet, I heard one of the company exclaim, "Why, that thing is just a common house plant."

The tone of surprise plainly showed that at least to one mind nature study with regard to growing things must be confined to wild flowers from their native haunts. I have often been tempted to use the term "tame flowers" for house plants because it so nearly expresses our proper relation towards these plant strangers from over the sea or from different parts of our own land, which, like many of our animal pets, certainly lived in a wild state before we made their acquaintance.

Do you know your tame plants? Many interesting observations may be made by those who carefully study their indoor plants while the snow may be flying outside.

Some few years ago an amaryllis, a native of South America, found its way into my window garden and the mechanism of its unfolding flower bud has been of never failing interest. The flower stalks, which often measure twenty-five inches in length, bear twin lilies six inches in diameter which are folded in a green sheath until they show their red coloring. The red sepals are much narrower than the petals and each sepal has a small greenish white projection at its point forming grooves or tiny pockets into which the tips of the petals are inserted.

By means of these grooves the petals of this large flower are wonderfully packed into small space. In one half of the bud two petal tips are inserted into the grooves of the sepal growing between the petals. The tip of the third large petal, upon which the stamen cluster rests in the open flower, is inserted between each of the remaining sepals. Contact and pressure due to this arrangement keep the two halves of

the bud tightly closed until the fork-like cluster of red stamens is fully grown, when it presses like so many finger ends against the inside of the corolla and the petals fly back like magic from their neat little pockets. The bud at the right stage of development may be artificially opened by pressing one's fingers against a petal.

It is interesting to note that the extreme tips of these red petals, where they were imprisoned in the bud, remain colorless and that the flower

But the spider flower (*Cleome pungens*) is decidedly opposed to this arrangement. The stamens "pull out backwards" from the closely folded petals that open after the stamens are nearly if not fully extended. It is interesting to watch the steps in this peculiar process yet, although every phase be closely examined, it is difficult to discover just how the force is applied which pulls the stamens out and why the plant has so astonishing a habit.



THE TWIN FLOWERS OF THE AMARYLLIS.

opens at night as if to welcome some nocturnal insect visitor from its native land. In a warm climate where heavy downpours of rain are of frequent occurrence, this little hinge-like device of the petals prevents the flower cup from being shaken out by the wind before the pollen has ripened.

STAMENS THAT PRECEDE THE PETALS.

One naturally thinks of the unfolding flower as opening the perianth before even a portion of the reproductive parts becomes visible. With the corolla wrapped closely around the stamens, it would seem to be the most logical order for the petals to be the first to unfold.

It is, however, probably due to their exceedingly rapid growth and to the constant resistance of the folded petals. The stamens, being held firmly at one end by the petals which are as firmly and obstinately rolled together, ceaselessly lengthen, until relief and freedom can be obtained only by bursting out at the side in the form of a curved spring which adds the force of its resilience to the stubborn resistance of the petals, the stamens finally escaping and leaving the petals still unfolded.

The Cleome is easily grown and is regarded as one of the best of our honey plants. The petals, which are of a lovely pink color, varying to white,



FIG. 1. A SERIES OF THE OPENING STAMENS.

are all on one side of the blossom, and the stamens, in proportion to the size of the entire bloom, are the longest of any others with which I am familiar. From their length and sprawling position in the flower, both of which suggest the sprawling legs of the spider, the plant takes its name of spider plant. The foliage too is charmingly ornamental. The pistil also "shoots" out to an astonishing length soon after the flower opens. At first it is only about an eighth of an inch long but speedily extends to three, four or even

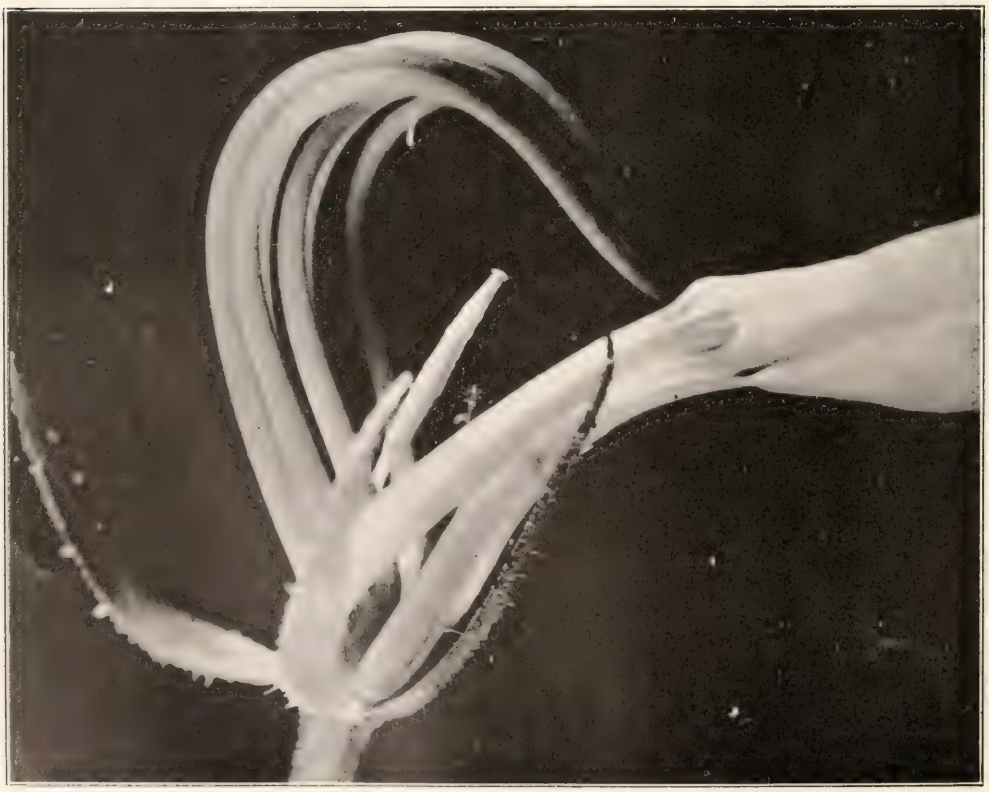


FIG. 2 ONE OF THE CLEOME FLOWERS GREATLY ENLARGED.

five inches. Cleome is well worth cultivation both for its beauty or for its peculiarities. It is as hardy as a weed, in fact it becomes a pernicious nuisance when one no longer wishes to have it grow.

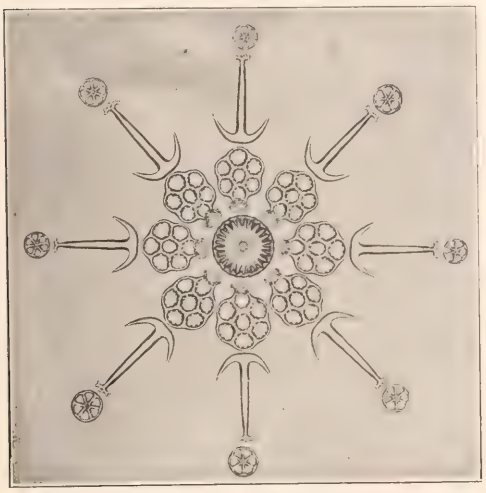
In Fig. 1 is shown a beautiful and instructive series of photographs of the curving stamens from the closed perianth to complete anthesis from a sub-sylindrical tube with closely oppressed sepals and not a trace of struggling stamens, through a gradually expanding calyx, gradually but ceaselessly bending stamens, until just before the petals spread apart the continuous pressure of the curved staminal spring has accomplished their freedom and they have spread themselves widely asunder, even while the tips of the petals are still unrolled. In this photograph there are several instructive features, of which not the least is the gradual separation and recurving of the sepals.

Fig 2 shows the parts greatly enlarged, with the appearance of the pistil, probably pulled free by the movements of the stamens.

SEEING BY AID OF THE LENS

THE ANCHORS AND PLATES OF SYNAPTA.

One of the sea cucumbers known to naturalists as the *Synapta,* is common in the sand along the coast of New Jersey, and of New England as far north as Massachusetts Bay, whence they may be dug between tidemarks. They move by means of strongly developed muscles situated beneath the skin. Feet and all appendages corresponding to feet are entirely absent. While the internal anatomy is rather complex and exceedingly strange and interesting, to the amateur microscopist the skin is the more attractive as it supplies him with two minute objects, which may be said to occur in "sets" since both are needed to complete each group.



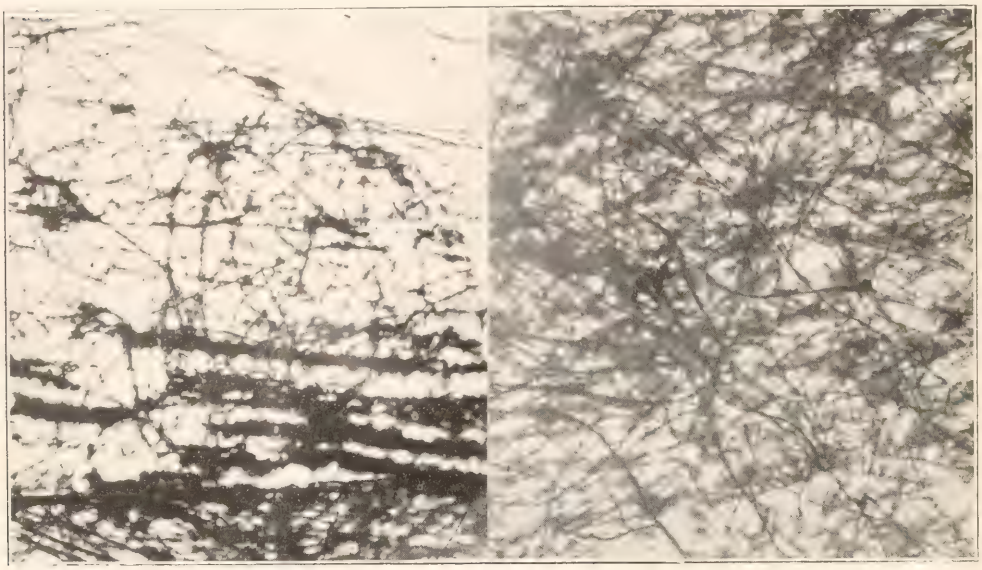
ANCHOR AND PLATES OF SYNAPTA.

These organs for a long time puzzled observers, as they failed to comprehend how they were combined, or whether or not they were connected in any way. They are the "anchors and plates," several of which are shown in the photograph, where they are arranged in an artistic pattern more to attract the esthetic fancy, than to instruct or to gratify one's scientific curiosity.

The eight objects grouped around the central disc are the so-called plates of *Synapta,* while the external row of anchor-like bodies are the so-called anchors. All these bodies are from a foreign species, European probably, and not from the common form of our

eastern coasts, in which the plates are much less ornate, having the apertures smooth, or nearly so, while those in the figure are crenated, or scalloped. That part of the anchor where the ring would be, is here extended laterally and cut into several teeth.

The perforated plates are attached to the skin of the *Synapta*, and the narrow end of the anchor is fastened to the narrow part of each plate, in such a manner that the shank and the flukes stand obliquely and freely upward. They are supposed to help the animal in its movements of locomotion.



PHOTOGRAPHS OF MICROSCOPIC STUDY OF SILK OF CECROPIA COCOON.

ORNITHOLOGY

AN OPEN FIELD FOR INVESTIGATION.

BY HENRY OLDYS, WASHINGTON, D. C.

Our museums are constantly growing richer through the labors of collectors. Bird and mammal skins, eggs, insects, plants, fossils—these and many other specimens are constantly finding their way into natural history cabinets. But the recording of bird songs offers a comparatively open field to those who possess a taste for exploration of the secrets of nature. And one can scarcely imagine a more refined or more delightful form of collecting. The pursuit violates no feelings of compunction, however sensitive, for the recorder of bird music leaves no trail of death behind him nor does he diminish in the slightest degree the stock from which he derives his material. His avocation involves the closest intimacy with nature's charms and with a form of art that is the furthest removed from the commonplace and utilitarian.

While there are many with whom these considerations would have no weight, to most of the readers of a magazine like THE GUIDE TO NATURE they should, and doubtless will, appeal with much force; and it is the interest of just such appreciative students of nature I wish to enlist. There are probably several who will read these words who are already capably equipped to pursue this phase of nature study and others who, with a little preparation, could properly equip themselves. I would urge upon all who combine a taste for music and love of nature to become reporters of bird music.

And why? Because of the immense amount of excellent material that is going to waste. There is great individual variation in the songs of certain species of birds; wood thrushes, song sparrows, hermit thrushes, orioles, meadowlarks and several others are gifted with such musical individuality that the songs of each species may be numbered by millions. Of wood thrushes whose tones were flat and most, if not quite, safe to assert that no two sing the same way. Geographical variation, also, causes musical variety. Moreover, the range of musical attainment varies greatly in different individuals. I have heard wood thrushes whose tones were flat and whose songs had little of pleasing melody and others that uttered most rhythmically melodious songs in rich liquid voices. Some song sparrows fully justify the contemptuous characterization of "that squeaky little bird" bestowed by a young lady on first acquaintance (to the chagrin of the ornithological friend who made the introduction) while others utter very sprightly and attactive bits of melody in rich musical tones.

On account of this 'personal equation' among birds, the woods and meadows are filled with attractive and interesting songs which, if not recorded will pass into oblivion when the short lives of the singers terminate. Hence the need of many recorders. Were all the musicians of the world to invade the wilderness and set to work transcribing noteworthy bird music much of it would still remain unheard and unrecorded.

Just here some thoughtful reader may be disposed to ask little Peterkin's question as to the good that will come of it at last. If so, I am, fortunately, able to give a more satisfactory answer than the boy elicited from old Kaspar. Apart from the assistance such records may lend in the identification of species by novices and aside from the interest that always attaches to collections, the recorded songs of birds offer a fascinating and fruitful field of study. Not only do they have an important bearing on questions relating to the evolution of birds but from the many resemblances they show to our music they throw much light on the study of the evolution of music itself and are of value in the investigation of the origin and development of the aesthetic taste, matters that have engaged the attention of our profoundest philosophers. The solution of many vexed questions may be greatly facilitated by careful study of ample material secured from the little musicians of the summer fields. Here, then, is value of great degree in this research to one who does not measure importance by dollars—one who appreciates the high character of knowledge that aids our attempts to penetrate the mysteries and uncertainties by which we are surrounded.

But while extending a hearty invitation to all capable investigators to enter this new field I would offer a word or two of caution and advice. I would urge the exercise of both care and patience. Fancy should never be allowed to supply the place of exactness and impatience to secure records should not be permitted to bring discouragement if at the outset no songs are heard that can be properly recorded on our musical staff. Most birds show a fine disregard for our scale and rules of musical construction and it is only occasionally that pure melodies are to be heard. I cannot too strongly emphasize the danger of invalidating work by inexactness.

For equipment the reporter of avian music requires a notebook, a pitch pipe or tuning fork, a watch (for ascertain-

ing the speed of the song), absolute sincerity of purpose and a tireless enthusiasm that will qualify him to remain practically motionless by the hour occasionally to secure a single song. Yet by way of encouragement I would add that week by week, month by month and season by season the collection of material will steadily grow and, as with all collections, will contain some prizes that will be ample reward for all the time and pains given to the pursuit.

SPRING BIRDS.

BY EDMUND J. SAWYER, SCHENECTADY, NEW YORK.

It is about time or even a little too late, according to the locality north or south, to look for the first "spring" bird. Though he may come before winter is over we do well in thinking of him as a sign of spring. Who can believe winter is not to all intents and purposes quite past when once he has heard the first bluebird? The storms



BLACK-THROATED WARBLER.
A watchful pose while descending a tree.

which may yet come hold no terrors. Nothing could be more fierce than some of the "sugar snow" storms of March and yet being associated in our minds with the first bluebirds and blackbirds they are little more dreaded than an April shower.

The subject of spring birds is by no means altogether a new one. But I have often wondered why certain species are so much neglected in this connection. Those who write on this subject have need to bear in mind that one bluebird (plus one robin) does not make a springtime. It requires phoebes, cowbirds and a few others. In fact I have so repeatedly seen the two last named before the earliest of the other birds that to me they are above all others the heralds of spring. The bluebirds do not go far south anyway and I have seen a robin in midwinter in Michigan. The phoebe is a fly-catcher and her coming is a pretty sure sign that mild weather will thenceforth be the rule though ice may



MARYLAND YELLOW-THROAT IN FULL SONG.
"Bring it here-er; bring it here-er; bring it here-er; bring it."

still cover all but the swiftest water in the brook where the phoebe has taken up her home.

It is not safe to predict the earliest spring bird. One year you will see



THE PHOEBE.

one kind and another year a different kind. One must spend part of every day afield for at least two weeks in March to be at all sure of seeing the earliest arrival. In most cases it happens that several species have come by the time the first is seen by the individual. A mild day comes, the cawing of crows or a rumor about robins reaches you and you go for the first excursion afield. Your list for that day will probably look something like this: song sparrow (many), bluebird (fairly common), phoebe (several), purple grackle (three), cowbird (a small flock on telegraph wires), robin (several), fox sparrow (a small, loose flock), unidentified (flock of one hundred birds flying north, probably red-winged blackbirds).

Finally arrive the warblers in April and May. There are sure to be some species to look for with special care. Local lists of these birds are always provisional, temporary, never final. The professional will have at least some doubtful notes to reinforce by closer observation, some question marks to erase and, it is all too probable, some specimens to collect.

THE AGASSIZ ASSOCIATION

TOO LITERARY.

A few of our Chapters miss the spirit of The Agassiz Association, because they make their programmes too literary. A timely selection from some standard naturalist, a bit of poetry (not too long) and a nature song or two may add to the social enjoyment, but a programme made up wholly of this kind of material with one or two general essays, is far from what we desire or should try to get. Go straight to nature, and when you return, tell us with all possible enthusiasm what you have observed.

If a literary selection from some naturalist is read, do not be contented with the mere sentiment, but tell who the author is and what he actually saw that suggested the essay and supplied its up lifting and helpful character.

A discussion of items or articles pertaining to nature, from newspapers or magazines, may well take, say ten minutes.

But do not depend on printing press and piano for the principal part of the program.

Eyes, eyes, eyes, eyes; again I say *eyes*. Do not forget to observe. See correctly; tell if possible in a lively and entertaining way. Nature is never "dry." A speaker or essayist who is nature's representative has no right,

and especially no excuse for being dull. If you are an uninteresting speaker or writer, you will soon be made to feel your limitations, and should accept the hint as gracefully and gratefully as may be. But if you yourself are really interested, you will be able to interest others. This is the secret of success in every pursuit, and likewise in every amusement.

"WORK AND PLAY WONDERFULLY COMBINED."

REPORT OF THE JOHNSTOWN (PENNSYLVANIA) CHAPTER, NO. 1011, OF THE AGASSIZ ASSOCIATION FOR THE YEAR OF 1908.

During the past year of nineteen hundred and eight the Johnstown Chapter has been steadily growing. It has become something definite with a definite purpose. However, it is as yet too new an organization to be fully appreciated by many here in the High School. Those who have joined are very enthusiastic.

Our Chapter is divided into two divisions. The boys, the first division, meet every other Saturday morning from ten to eleven o'clock; the girls, the second division, meet every other Wednesday afternoon from half past three to half past four. I personally do not like this division of the Chapter but it seems impossible to arrange it differently. The divisions work together as nearly as possble.

The study of the Coleoptera (beetles) has been taken up systematically and quite a number of the more common species have been discussed at length. These insects have been studied from collections made by Carl Glock and Albert Walters during last June, July and August. Over twelve different families and several genera of each family are represented in these collections. In the study we used almost entirely Prof. Comstock's book, "Manual for the Study of Insects."

At several meetings some of the lowest types of animals were studied through the microscope. The *Paramaecium* and *Rotifer vulgaris* were particularly dwelt upon. The material for this study was gathered by Philip Wolle.

We are looking forward into a bright future. As we progress with our studies new fields of interest are opened before us, fields in which work and play are wonderfully combined, and the little knowledge which we gain we feel is well worth while.

PHILIP WOLLE, Secretary.

LOCAL RAIN CAUSED BY TREES.

FROM GEO. W. WAYMOUTH, PRESIDENT FRIENDS' ACADEMY CHAPTER, NO. 1016, OF THE AGASSIZ ASSOCIATION, LOCUST VALLEY, NEW YORK.

A few days ago I was walking alone in a field in the neighborhood of a duck pond surrounded by tall trees, when I saw a strange sight, strange to me for I have never noticed it before. To all appearances it was raining on the pond but not outside. It had rained hard all over this section during the morning and now in the afternoon there was a heavy fog. I thought it might be the rain water falling off the trees but on looking at a fence a little way off I saw I was mistaken, for no water fell from it like it did from the trees. After thinking a little while I found out the cause of its raining on the pond in a fog and not on the land. The trees being cooled by the morning rain were colder than the atmosphere and condensed the water of the atmosphere so that it fell as rain. I have just mentioned this because it seemed so strange to me.

This was a very sharp observer and it will take an equally sharp one to elucidate the phenomenon. I know of no theory that will be satisfactory.

The first question is "Did it seem to be raining over the whole pond, or only around the edges under the trees? If there was no wind then the cooling of the foggy air by the cold trees might produce raindrops, but they would fall only beneath the trees and not on the middle of the pond. If there was a wind, which is rare in such a fog, then drops formed near the tops of the trees could fall in the center of the pond.

It is not likely that the trees after being cooled by the morning rain, remained cooler after the fog had formed, but they would have the same temperature as the fog. I think there must have been a slight motion of the fog downwards from some higher ground, bringing with it the larger drops that fell like rain.

Why could it not have been a drizzling fog whose drops fell on the surface of the pond?—Cleveland Abbe, Weather Department, Washington.

STUDYING NATURE PEDAGOGY.

REPORT OF E. EARL DUBOIS, CORRESPONDING MEMBER, NO. 2042, OGDENSBURG, N. Y.

I do not know as I can make much of a report of my work as a Corresponding Member of the AA this year because I have been a member only a few months. Last summer my spare time was devoted to my camera and to furthering my nature knowledge in a general way, such as naming species in new localities, etc.

Then, too, I have spent considerable time for several months in making a comparative study of the systems of teaching nature study in the schools of various countries. Especially in this state, our systems are far behind those of Canada and some European countries. It seems about time we were getting awake to our position in the educational world. This is a work that takes more of my interest than a mere study of nature because I can only know a little at best and I now, I think, have learned enough to get the correct view point in nature study and in education. I enclose a specimen of the outlines I use at various times, thinking you may be interested in it. You probably noticed my article in the November issue of *The Nature-Study Review*.

Next summer I expect to be able to take up some line of field work.

[With this report was an excellent outline for "The Story of a Tree." Mr. DuBois believes that; "Nature study is an effort to put the life of man in harmony with that of nature. Its means is simple observational study; its results, greater happiness and efficiency."]

A MOUSE CATCHING FLIES.

BY FREDERICK SCHWANKOVSKY, JR., CORRESPONDING MEMBER NO. 2053 OF THE AGASSIZ ASSOCIATION, DETROIT, MICHIGAN.

I noticed a mouse doing some "stunts," which were so peculiar as to merit special notice. It was in broad daylight in the show window of a large down town business house. The big plate glass window was set in a heavy frame and along this frame on the inside of the glass I noticed a mouse and some flies. The latter buzzed against the glass for a while and then fell to the frame at the bottom, rested a moment and then buzzed up again. The mouse, however, was very busy reducing the number of flies. It would watch until a fly got near the bottom of the glass and then rush forward and catch it deftly between its front feet as a boy would catch a baseball. Then sitting up it would calmly eat the captured fly. It caught and ate three while I watched and only a boy tapping on the glass finally scared it away. It seems to me this mouse seemed not only bold but very capable of adjusting itself to circumstances, of devising ways and means for taking care of itself.

HORNET MET BUMBLEBEE!.

A True Story.—The minister was making a parishional call, and the youngest member of the family, a small boy of tender years, finally mustered sufficient courage to inquire his name: "My name," replied the clergyman pleasantly, "is Mr. Jehonnet, what is your name?" Astonished out of all prudence by so singular a name and convinced that the minister was "funning," he mastered his surprise as best he could and gravely replied: "My name is Mr. G. Bumblebee."—"Entomological News."

He who has discovered little beauty within finds but little without; and he who has realized great beauty within, sees it overflowing in Nature. —"Where Dwells the Soul Serene," by Stanton Kirkham Davis.

LITERARY AND BIOGRAPHICAL

The Biota of The San Bernardino Mountains. By Joseph Grinnell. Berkeley, California: The University Press.

This University publication interestingly and scientifically tells the territory visited and the life zones and discusses the bird population (one hundred and thirty-nine species) and the influences modifying it, the plants of the region, the mammals (thirty-five species) and the reptiles (twenty species).

The author is a well known naturalist and has excellently done the work assigned to him.

Species and Varieties, Their Origin by Mutation. By Hugo DeVries, Professor of Botany in the University of Amsterdam. Edited by Daniel Trembly MacDougal. Second Edition. Chicago: The Open Court Publishing Company.

"Professor DeVries has rendered an additional service to all naturalists by the preparation of the lectures on mutation published in the present volume. A perusal of the lectures will show that the subject-matter of "Die Mutationstheorie" has been presented in a somewhat condensed form, and that the time which has elapsed since the original was prepared has given opportunity for the acquisition of additional facts, and a re-examination of some of the more important conclusions with the result that a notable gain has been made in the treatment of some complicated problems.

"It is hoped that the appearance of the English version of the theory of mutation will do much to stimulate investigation of the various phases of the subject. This volume, however, is by no means intended to replace, as a work of reference, the larger book with its detailed recital of facts and its comprehensive records, but it may prove a substitute for the use of the general reader."

The Primary Factors of Organic Evolution. By E. D. Cope, Ph. D. Chicago: The Open Court Publishing Company.

From the mass of facts accumulated by biologists, the author has selected such as, in his opinion, throw a clear light on the problem of organic evolution, especially that of the animal kingdom. He has depended chiefly in his demonstrations on paleontologic research.

Commercial Violet Culture. A Treatise on the Growing and Marketing of Violets for Profit. By B. T. Galloway,, Chief of the Bureau of Plant Industry, United States Department of Agriculture. Second Edition, Revised. New York City: A. T. DeLamere Printing and Publishing Company, Ltd.

This hand book gives all details for preparation of soil, construction of houses and frames, care of plants and marketing of the flowers. It is almost wholly from the business point of view, but contains much of interest to the amateur.

The author shows, however, that under the dollars and cents is a real love for nature. He says, "From the facts given it will be seen that no big fortunes are to be made in violet growing; but if a man loves Nature and that quiet and peace which work with her should always bring, there is a chance here to open her doors. Thus a love for all that is good and beautiful may be cultivated and a respectable living made at the same time."

Goldfish Breeds and Other Aquarium Fishes. Their Care and Propagation. By Herman T. Wolf. Philadelphia, Pennsylvania: Innes & Sons.

This is a new and thoroughly up-to-date book on the aquarium and its inhabitants. It represents the total experience of the aquarium enthusiasts comprising the Aquarium Society of Philadelphia and the scientific knowledge of a number of members of the famous Academy of Natural Sciences. The author is an active member of both organizations and as secretary of The Aquarium Society for a number of years had ideal opportunities for writing just such a complete and practical book.

In addition, Mr. Wolf is an artist of unusual ability. His illustrations of aquarium life are extremely natural and beautiful.

Altogether this is far the best aquarium book that has ever appeared in any language and should be owned by every aquarist and naturalist.

Every point mentioned is taken up thoroughly and practically.

The book is 7 x 10½ inches, fine paper, gilt top, 390 pages and contains 280 life-size illustrations, including a frontispiece in colors.

The illustrations alone are worth the price of the book, $3.00.

Books may be kept on one day's approval. Money refunded if not entirely satisfactory.

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